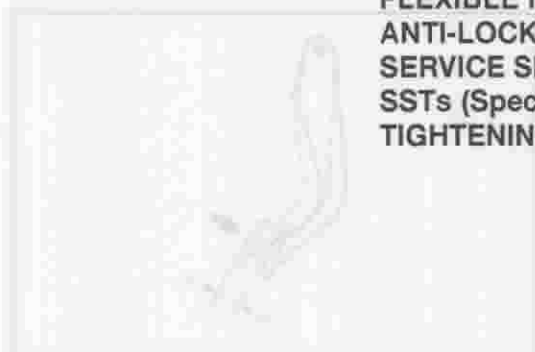


INSPECTION AND ADJUSTMENT OF BRAKE PEDAL



1. Check the brake pedal for the correct height.

2. Check the brake pedal for the correct height.

Model	Height
MT	1.55 m (5 ft 1 in)
AT	1.55 m (5 ft 1 in)
MT	1.55 m (5 ft 1 in)
AT	1.55 m (5 ft 1 in)

BR

BRAKE

INSPECTION AND ADJUSTMENT OF

BRAKE PEDAL	BR- 2
BRAKE PEDAL	BR- 5
BRAKE MASTER CYLINDER	BR- 7
BRAKE BOOSTER	BR-12
FRONT BRAKE	BR-14
REAR BRAKE	BR-20
PARKING BRAKE	BR-27
PROPORTIONING VALVE	BR-29
FLEXIBLE HOSE	BR-30
ANTI-LOCK BRAKE SYSTEM	BR-32
SERVICE SPECIFICATIONS	BR-70
SSTs (Special service tools)	BR-70
TIGHTENING TORQUE	BR-71

LBR00001-00000

INSPECTION AND ADJUSTMENT OF BRAKE PEDAL

1. Brake pedal height check

- (1) Check the pedal height from the asphalt sheet.

Specified Value:

RHD

MT: 148.0 ± 5 mm

AT: 149.8 ± 5 mm

LHD

MT: 143.7 ± 5 mm

AT: 148.4 ± 5 mm

2. Pedal height adjustment

- (1) Disconnect the connector of the stop lamp switch.
- (2) Remove the stop lamp switch by loosening the lock nut ①.
- (3) Loosen the lock nut ②. Adjust the pedal height by turning the push rod ③.
- (4) Tighten the lock nut of the push rod.

Tightening Torque: 22.6 - 28.4 N·m

- (5) Screw-in the stop lamp switch, until it comes in contact lightly with the pedal stopper.

- (6) Adjust the clearance between the pedal stopper and the edge surface at the screw section of the stop lamp switch to 1.5 mm.

- (7) Tighten the lock nut of the stop lamp switch.

Tightening Torque: 19.4 - 31.6 N·m

- (8) Connect the connector of the stop lamp switch. Ensure that the stop lamp goes on.

3. Pedal free travel check

- (1) After stopping the engine, depress the brake pedal several times so that no negative pressure may remain in the booster.
- (2) Lightly push the pedal by your hand. Measure the distance (free travel) up to a point where you feel a resistance from the pedal.

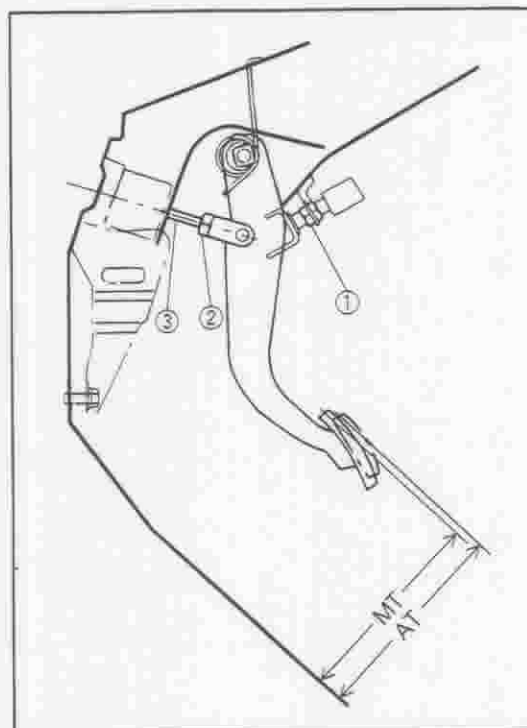
Specified Value: 0.5 - 3.0 mm

4. Pedal free travel adjustment

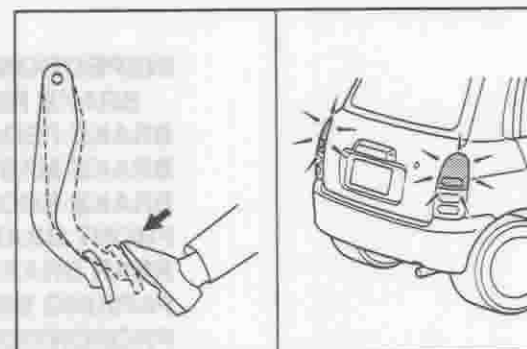
- (1) Loosen the lock nut ①.
- (2) Adjust the free travel to 0.5 - 3.0 mm by turning the push rod ②.
- (3) Tighten the lock nut.

Tightening Torque: 22.6 - 28.4 N·m

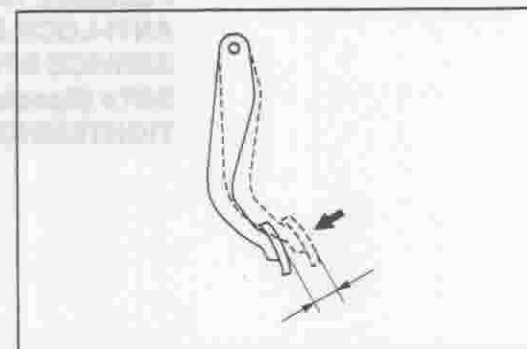
- (4) Ensure that the stop lamp goes on.



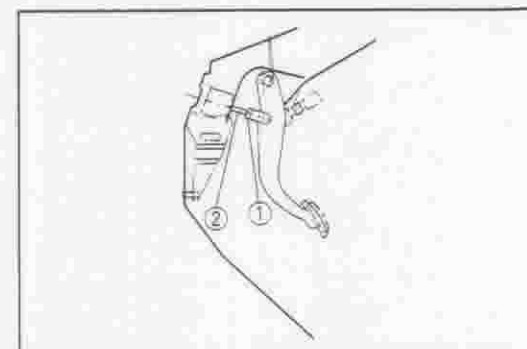
LBR00002-00001



LBR00003-00002



LBR00004-00003



LBR00005-00004

5. Pedal reserve travel check

- (1) Run the engine at the idling speed.
- (2) Release the parking brake lever.
- (3) Depress the brake pedal with a pedal applying force of 300 N. Measure the distance from the upper surface of the brake pedal pad to the asphalt sheet surface when the brake pedal stops.

Specified Value:

RHD

M/T: At least 74.0 mm

A/T: At least 78.0 mm

LHD

M/T: At least 68.0 mm

A/T: At least 69.0 mm

BRAKE BOOSTER OPERATION CHECK

1. Operation check

- (1) With the engine stopped, depress the brake pedal several times. Ensure that the brake pedal height does not vary at each application.
- (2) Start the engine while depressing the brake pedal. If the brake pedal moves slightly toward the floor, it indicates that the booster is functioning properly.

2. Air-tight performance check

- (1) Start the engine. Then, stop it one or two minutes later.
- (2) Depress the brake pedal slowly several times. Check the change in height of the brake pedal.
- (3) If the position of the brake pedal rises progressively from the 1st application to the 3rd application, it indicates the brake booster is functioning properly.

NOTE:

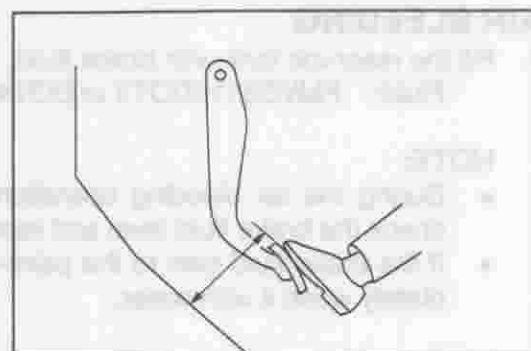
- Intervals between the pedal applications should be at least five seconds.

3. Air-tight performance check under loaded condition

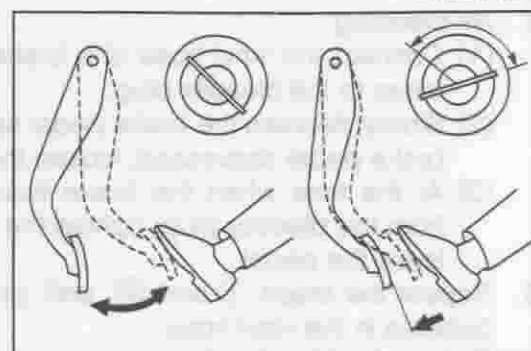
- (1) With the engine running, depress the brake pedal.
- (2) With the brake pedal depressed, stop the engine and maintain the depressed condition for 30 seconds.
- (3) If the height of the brake pedal does not change, it indicates the air-tight performance is normal.

4. Air-tight performance check under loaded condition by means of negative pressure gauge

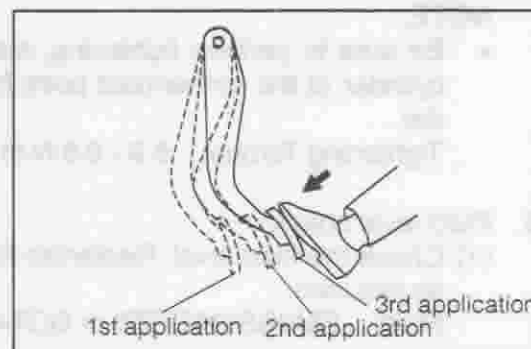
- (1) Connect a negative pressure gauge to the booster and intake manifold, using a three-way joint.
- (2) With the engine running, depress the brake pedal with a pedal applying force of 200 N. When the reading of the negative pressure gauge reaches 500 mmHg, stop the engine.
- (3) If the drop in negative pressure for 15 seconds after the engine has been stopped is within 25 mmHg, it indicates the air-tight performance is normal.



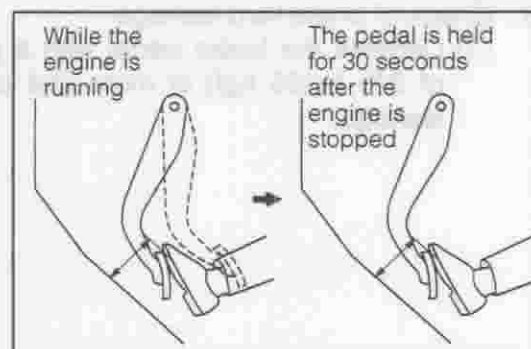
LBR00006-00005



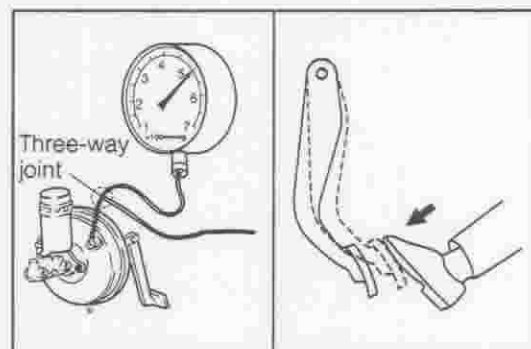
LBR00007-00006



LBR00008-00007



LBR00009-00008



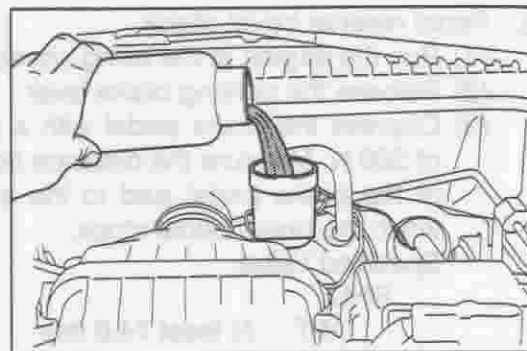
LBR00010-00009

AIR BLEEDING

1. Fill the reservoir tank with brake fluid.
Fluid: FMVSS116DOT3 or DOT4

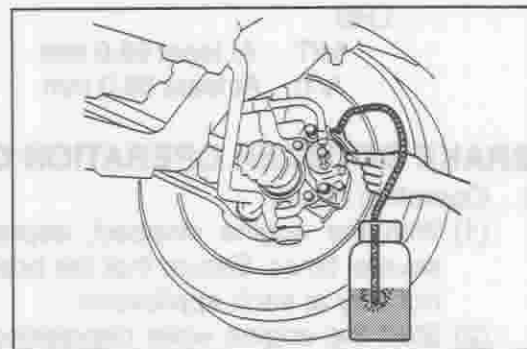
NOTE:

- During the air bleeding operation, be sure to always check the brake fluid level and replenish, as required.
- If the brake fluid gets to the paint-finish surface, immediately wash it with water.



LBR00011-00010

2. Air bleeding
 - (1) Connect the vinyl hose of a brake fluid receiving container to the bleeder plug.
 - (2) Slowly depress the brake pedal several times. With the brake pedal depressed, loosen the bleeder plug.
 - (3) At the time when the brake fluid ceases to flow out from the bleeder plug, tighten the bleeder plug and release the pedal.
3. Repeat the steps ① and ②, until you no longer observe bubbles in the vinyl hose.
4. Tighten the bleeder plug.



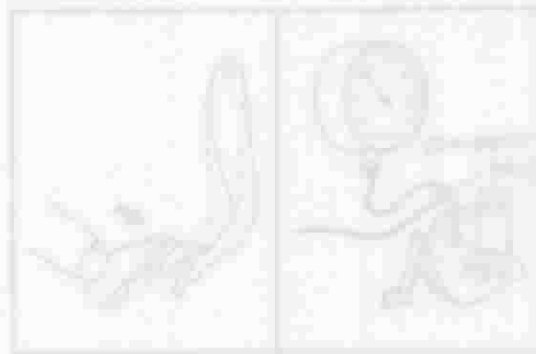
LBR00012-00011

NOTE:

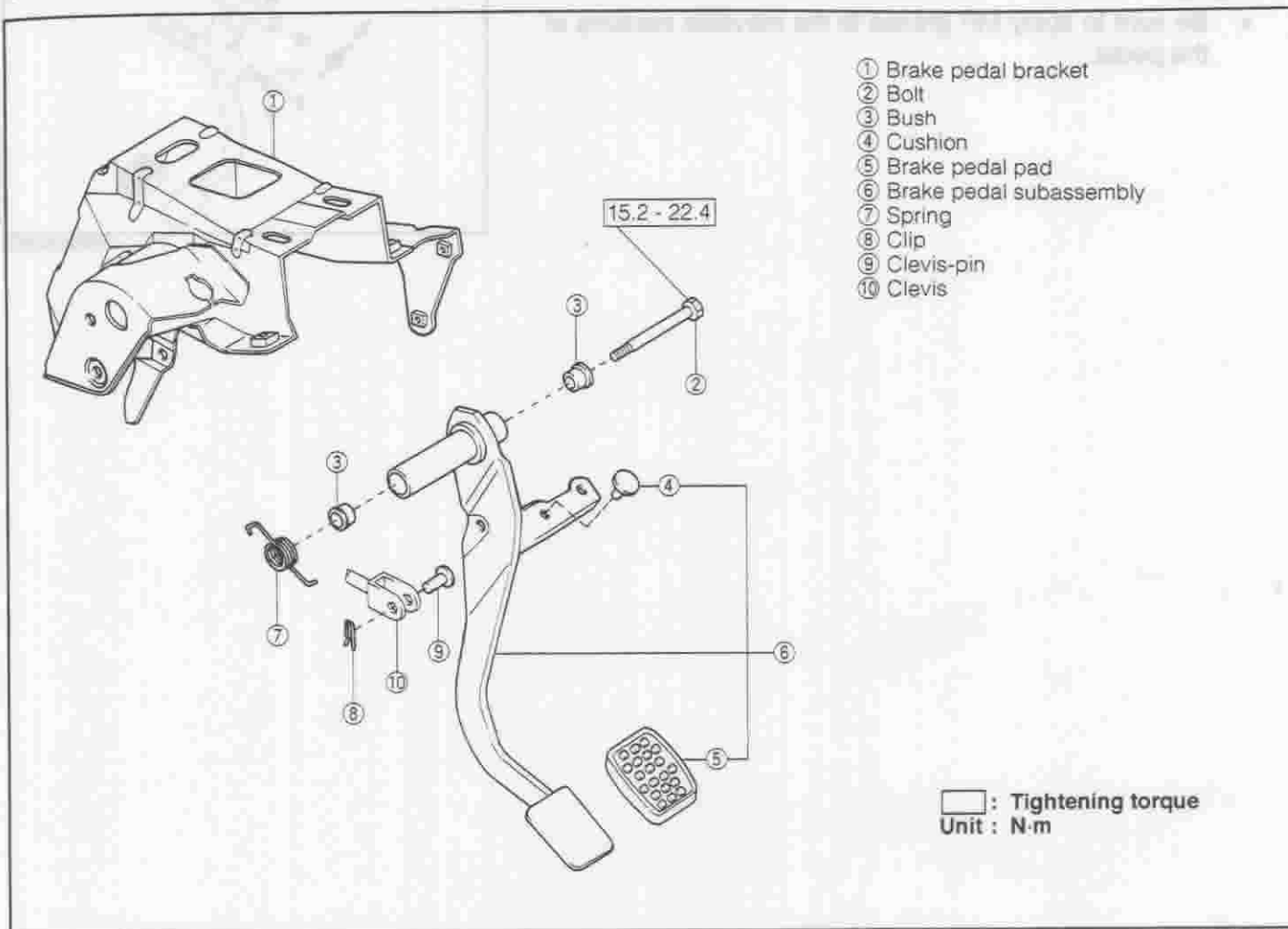
- Be sure to perform tightening, starting from the wheel cylinder at the farthest point from the master cylinder.
- Tightening Torque: 6.9 - 9.8 N·m

5. Fluid level check
 - (1) Check the fluid level. Replenish fluid to the MAX level, as required.
- Fluid: FMVSS116DOT3 or DOT4

6. Check of brake fluid leakage
 - (1) Depress the brake pedal with a pedal applying force of 245 N (25 kgf) or more and check the brake fluid leakage.



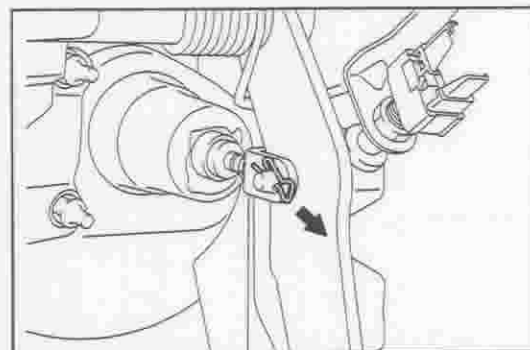
BRAKE PEDAL COMPONENTS



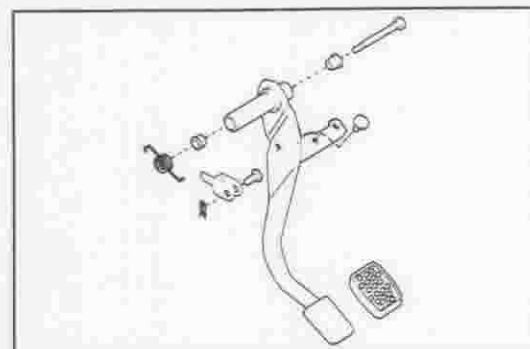
LBR00013-00012

REMOVAL

1. Remove the instrument panel finish lower panel.
2. Disconnect the stop lamp connector.
3. Remove the stop lamp switch.
4. Disconnect the cable from the clutch pedal. (Manual transmission vehicles)
5. Remove the clip and clevis pin from the brake pedal clevis.
6. Remove the brake pedal bracket.
7. Remove the clutch pedal and brake pedal.
8. Remove the return spring.
9. Remove the bush from the pedal.



LBR00014-00013



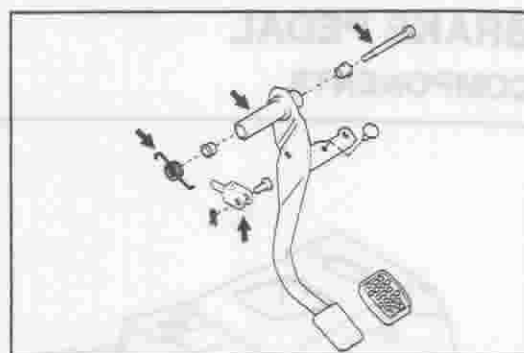
LBR00015-00014

INSTALLATION

1. Reverse the removal procedure to install the pedal.

NOTE:

- Be sure to apply MP grease to the movable sections of the pedal.



LBR00016-00015

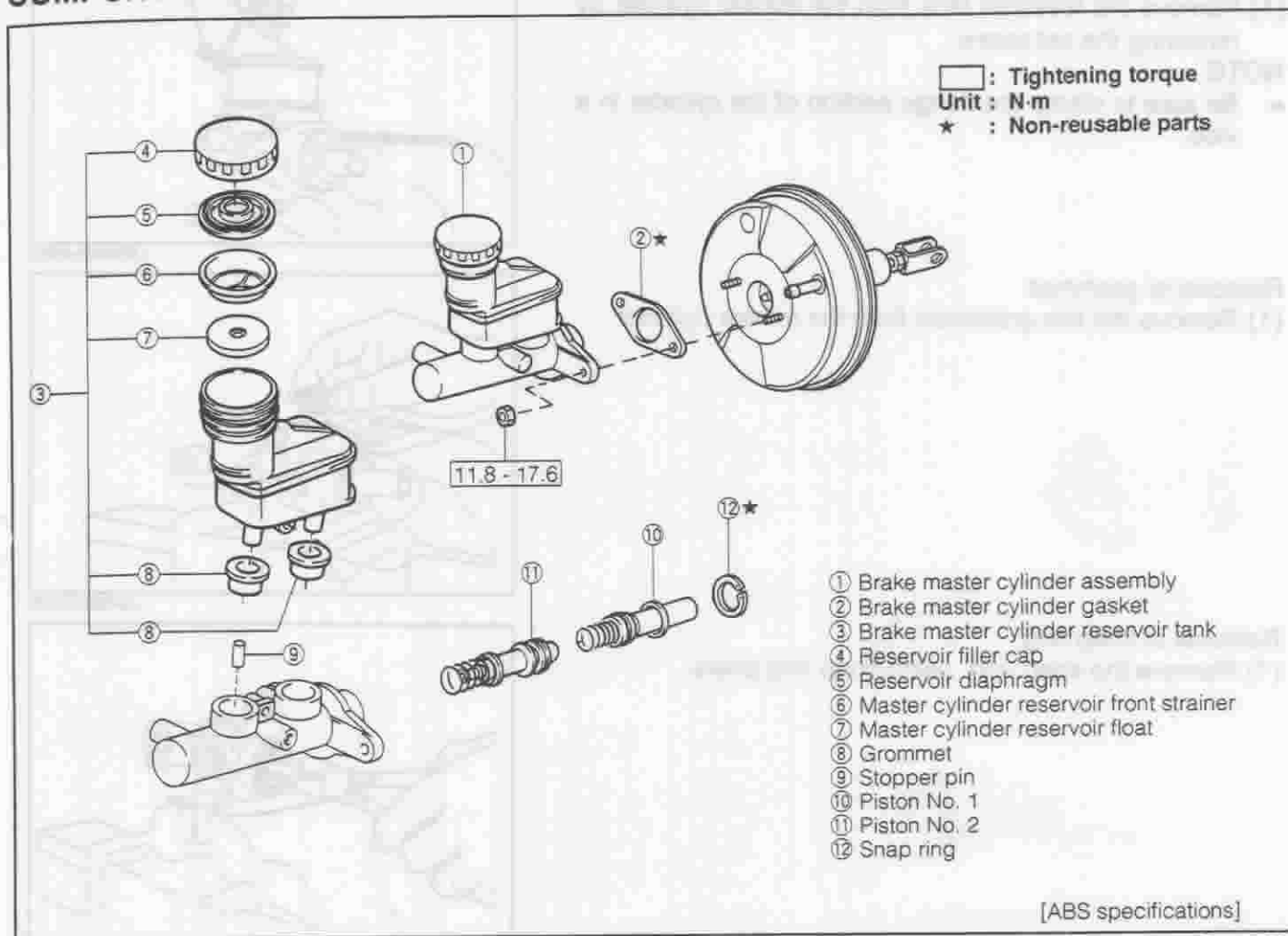


REMOVAL

1. Remove the top plate from the pedal.
2. Disconnect the top plate from the pedal.
3. Remove the top plate from the pedal.
4. Disconnect the top plate from the pedal.
5. Remove the top plate from the pedal.

6. Remove the top plate from the pedal.
7. Remove the top plate from the pedal.
8. Remove the top plate from the pedal.
9. Remove the top plate from the pedal.

BRAKE MASTER CYLINDER COMPONENTS



LBR00017-00016

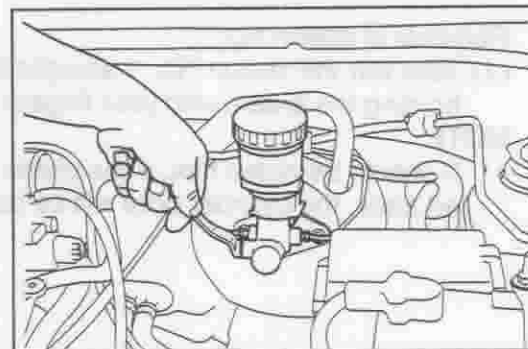
REMOVAL

1. Disconnect the connector of the brake fluid level warning lamp switch.
2. Drain the brake fluid, using a syringe.

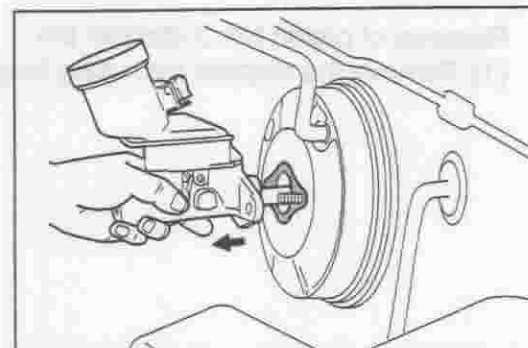
NOTE:

- If the brake fluid gets to the paint-finish surface, immediately wash it with water.

3. Disconnect the brake tube from the master cylinder, using a flare nut wrench.
4. Remove the master cylinder and gasket from the booster by removing the attaching nuts.



LBR00018-00017



LBR00019-00018

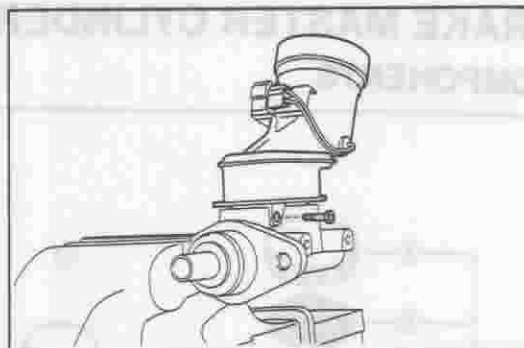
DISASSEMBLY

1. Removal of reservoir tank

- (1) Remove the reservoir tank from the master cylinder by removing the set screw.

NOTE:

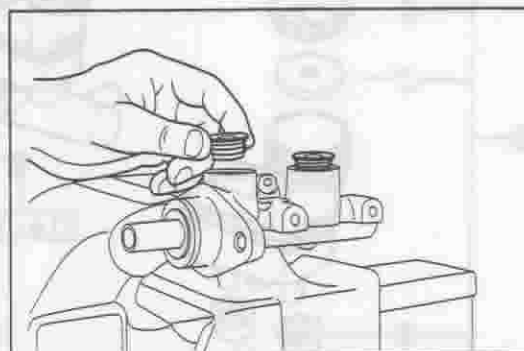
- Be sure to clamp the flange section of the cylinder in a vice.



LBR00020-00019

2. Removal of grommet

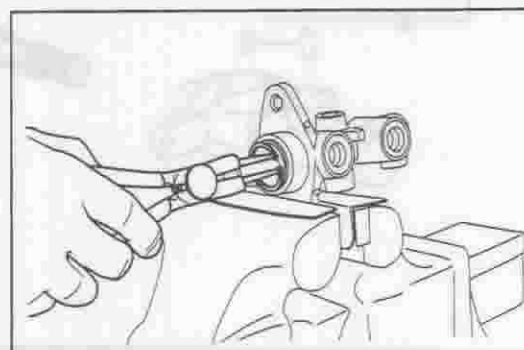
- (1) Remove the two grommets from the master cylinder.



LBR00021-00020

3. Removal of snap ring

- (1) Remove the snap ring, using snap ring pliers.



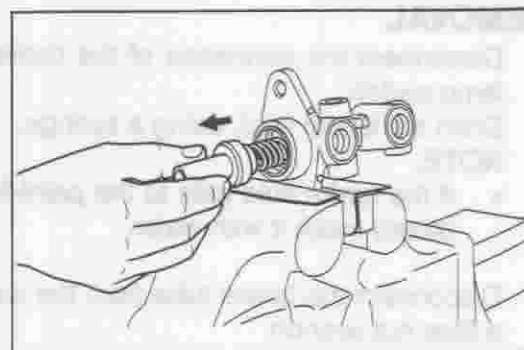
LBR00022-00021

4. Removal of piston No. 1

- (1) Take out the piston No. 1 straight from the cylinder by holding the piston with your fingers.

NOTE:

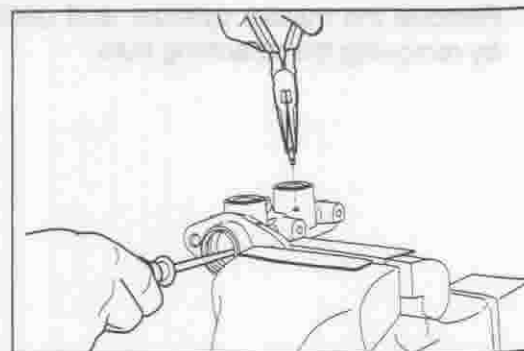
- It should be noted that, if the piston is taken out in a tilted state, the cylinder bore will be scored.



LBR00023-00022

5. Removal of piston No. 2 stopper pin

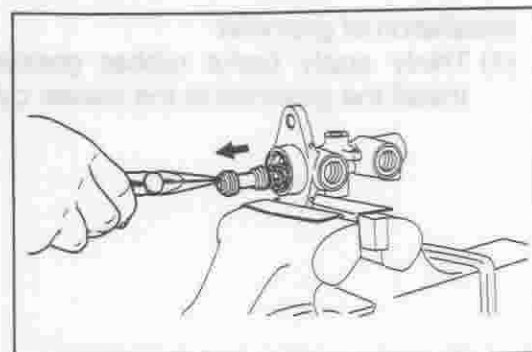
- (1) Remove the stopper pin, using long-nose pliers.



LBR00024-00023

6. Removal of piston No. 2

- (1) Take out the piston No. 2 straight by lightly holding the piston by means of long-nose pliers.
- (2) When the edge surface of the piston comes out, hold it with your fingers and take out the piston straight from the cylinder.



LBR00025-00024

INSPECTION

NOTE:

- Clean each section of the disassembled parts by blowing compressed air.
1. Check to see if the cylinder bore exhibits rust and scores.
 2. Check to see if the cylinder exhibits wear and damage.
- If any malfunction is found, replace the cylinder with a new one.

LBR00026-00000

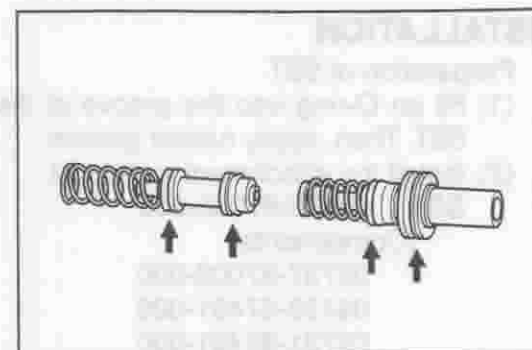
ASSEMBLY

1. Installation of piston

CAUTION:

- Care must be exercised so that the rubber lip section of the piston may not be damaged.

- (1) Thinly apply brake rubber grease to the rubber parts of the pistons No. 1 and No. 2.



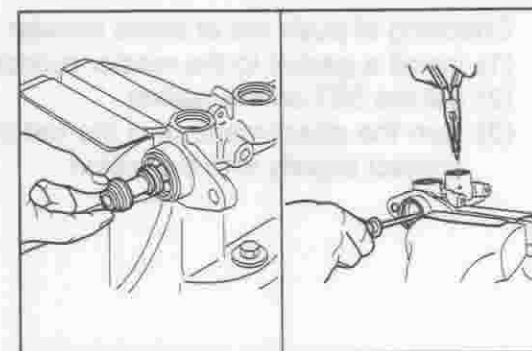
LBR00027-00025

2. Installation of piston No. 2

- (1) Press the piston No. 2 into the cylinder and attach the stopper pin.

NOTE:

- Be sure to insert the piston straight into the cylinder. It should be noted that, if the piston is inserted in a tilted state, the bore will be scored.



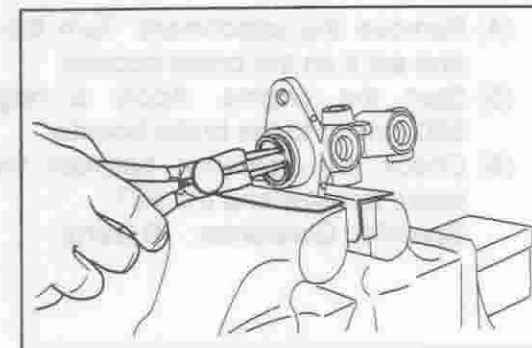
LBR00028-00026

3. Installation of piston No. 1

- (1) Attach a snap ring, using snap ring pliers. Ensure that the snap ring has fitted positively into the ring groove.

CAUTION:

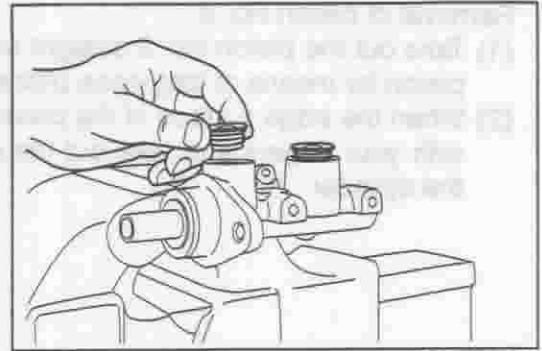
- Be sure to use a new snap ring.



LBR00029-00027

4. Installation of grommet

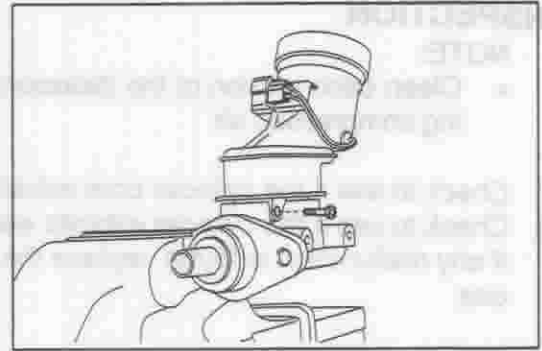
- (1) Thinly apply brake rubber grease to the grommet.
Install the grommet to the master cylinder.



LBR00030-00028

5. Installation of reservoir tank

- (1) Insert the reservoir tank into the master cylinder.
- (2) With the reservoir tank pressed onto the master cylinder, tighten the set screw.



LBR00031-00029

INSTALLATION

1. Preparation of SST

- (1) Fit an O-ring into the groove at the rod section of the SST. Then, apply rubber grease.
- (2) Install the attachment to the rod.

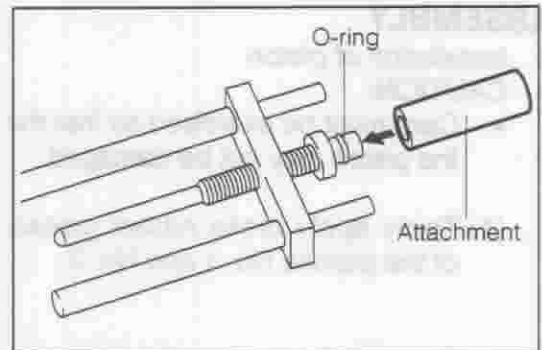
SST: 09733-87002-000

(Components)

09737-87003-000

09733-87401-000

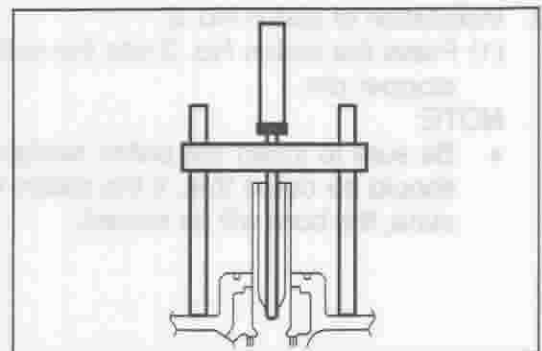
09731-87401-000



LBR00032-00030

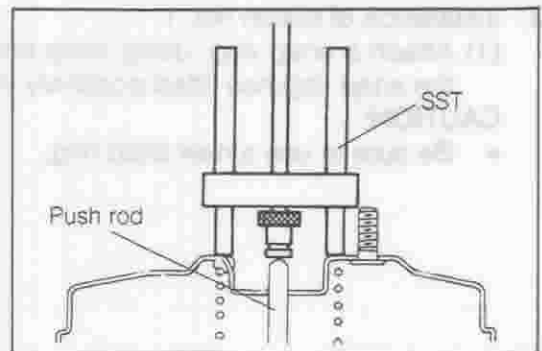
2. Checking of push rod of brake booster for length

- (1) Install a gasket to the master cylinder.
- (2) Set the SST on the gasket.
- (3) Turn the attachment, until the rod of the SST comes in contact slightly with the piston.



LBR00000-00031

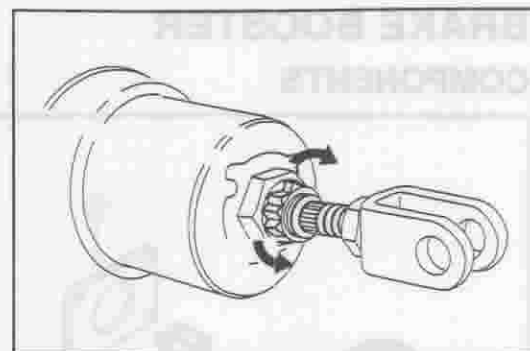
- (4) Remove the attachment. Turn the SST upside down and set it on the brake booster.
- (5) Start the engine. Apply a negative pressure of 500 mmHg to the brake booster.
- (6) Check the clearance between the push rod of the brake booster and the SST.
Specified Clearance: 0 (zero)



LBR00033-00032

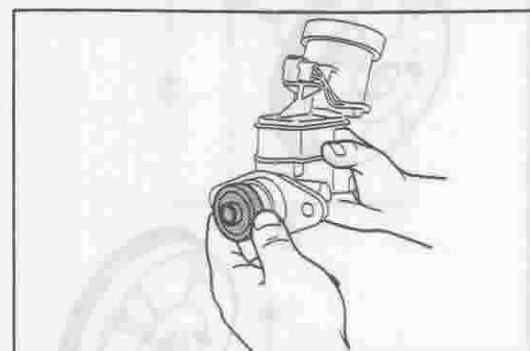
3. Adjustment of length of push rod of brake booster
 - (1) Loosen the lock nut. Adjust the length of the rod by turning the adjusting nut at the valve body side.
 - (2) Tighten the lock nut.

Tightening Torque: 17.6 - 24.5 N·m



LBR00034-00033

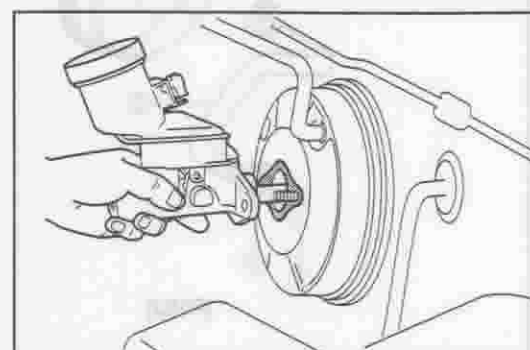
4. Installation of master cylinder
 - (1) Apply brake rubber grease to the piston rod of the master cylinder.
 - (2) Apply brake rubber grease to the rod seal. Install the rod seal to the master cylinder.



LBR00035-00034

- (3) Install the master cylinder to the brake booster with the two attaching nuts.

Tightening Torque: 11.8 - 17.6 N·m

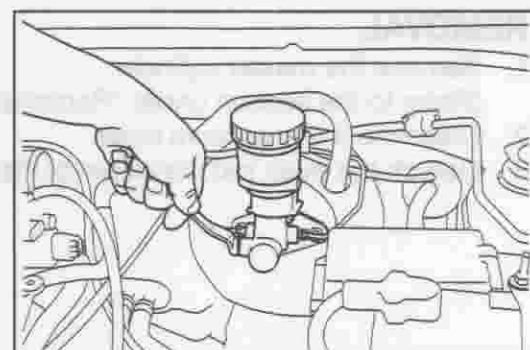


LBR00036-00035

5. Installation of brake tube
 - (1) Connect the brake tube to the master cylinder, using a flare nut wrench.

Tightening Torque: 12.7 - 17.7 N·m

- (2) Connect the vacuum hose to the booster.

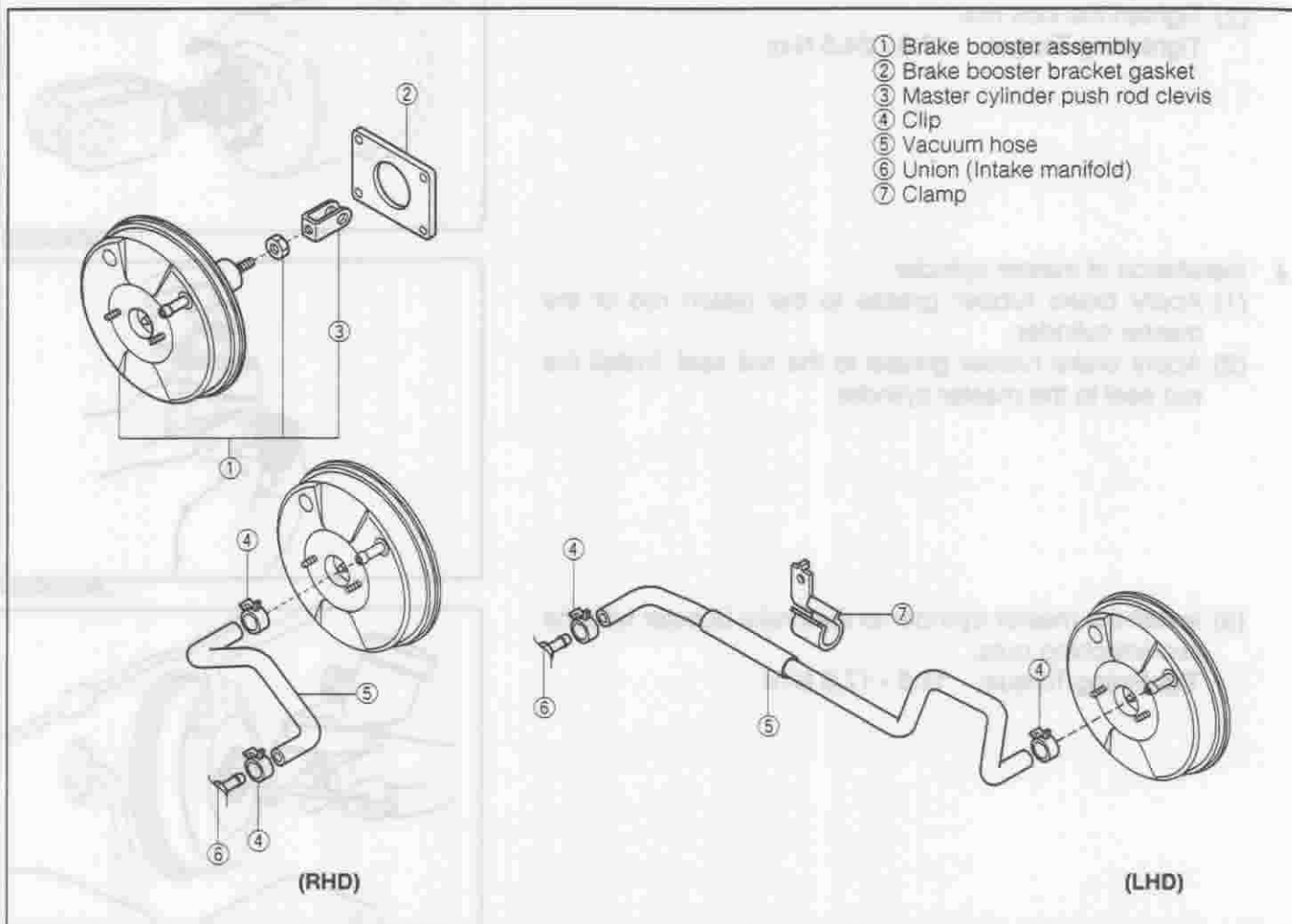


LBR00037-00036

6. Fill the reservoir tank with brake fluid.
7. Perform air bleeding for the brake system. (Refer to the section under "Air Bleeding.")
8. Depress the brake pedal with a pedal applying force of 245 N (25 kgf) or more and check the brake fluid leakage.
9. Perform the function check of the brake booster. (Refer to the section under "Brake Booster Operation Check.")

LBR00038-00000

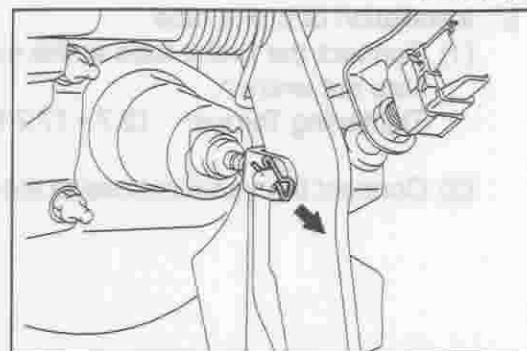
BRAKE BOOSTER COMPONENTS



LBR00039-00037

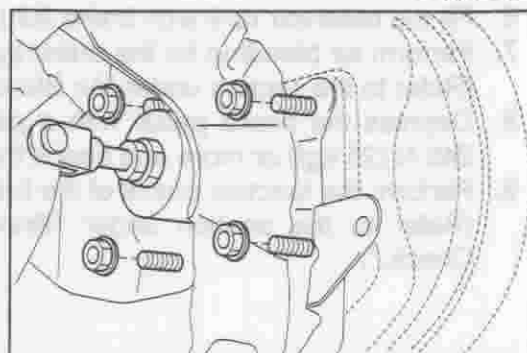
REMOVAL

1. Remove the master cylinder.
(Refer to the section under "Removal of Master Cylinder.")
2. Disconnect the vacuum hose.
3. Detach the push rod clevis pin of the brake pedal.



LBR00040-00038

4. Remove the brake booster.
 - (1) Remove the four set nuts of the brake booster.
 - (2) Remove the brake booster from the dash panel.



LBR00041-00039

INSPECTION

1. Check of check valve
 - (1) Ensure that there is air continuity from the brake booster side to the engine side. Conversely, ensure that there is no air continuity from the engine side to the brake booster side.
If the above condition is not satisfied, replace the hose.
2. Check the clearance between the push rod and the master cylinder. (Refer to the section under "Installation of Master Cylinder.")

INSTALLATION

1. Install the brake booster and gasket with the four nuts.
Tightening Torque: 9.8 - 15.7 N·m

2. Connect the vacuum hose.

NOTE:

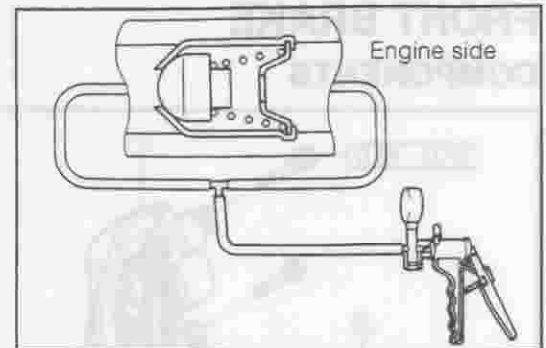
- Make sure that the [ENGINE] stamp mark of the hose faces upward. Also, the hose should be connected to the union at the manifold side.
- Make sure that the hose has been connected in an untwisted state.

3. Connect the clevis to the brake pedal.

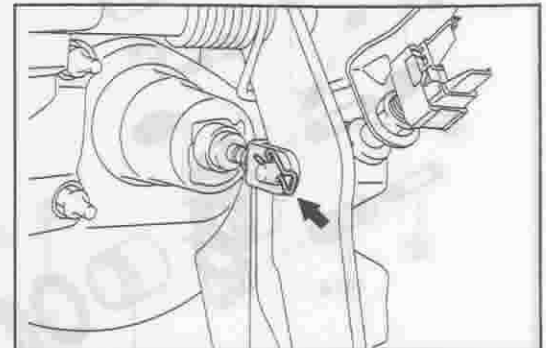
NOTE:

- Be sure to use a new clip for the clevis pin.
- Be sure to apply MP grease to the clevis pin.

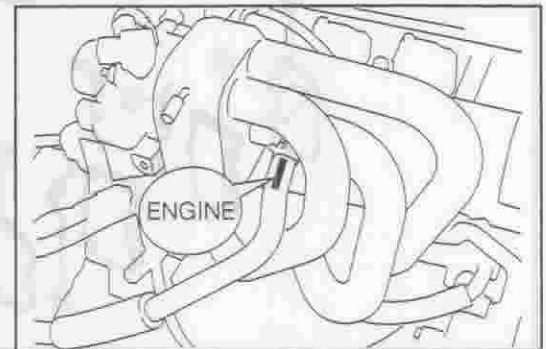
4. Adjustment of brake pedal
(Refer to the section under "Adjustment of Brake Pedal.")
5. Install the brake master cylinder.
(Refer to the section under "Brake Master Cylinder.")
6. Air bleeding of brake system
(Refer to the section under "Air Bleeding.")



LBR00042-00040

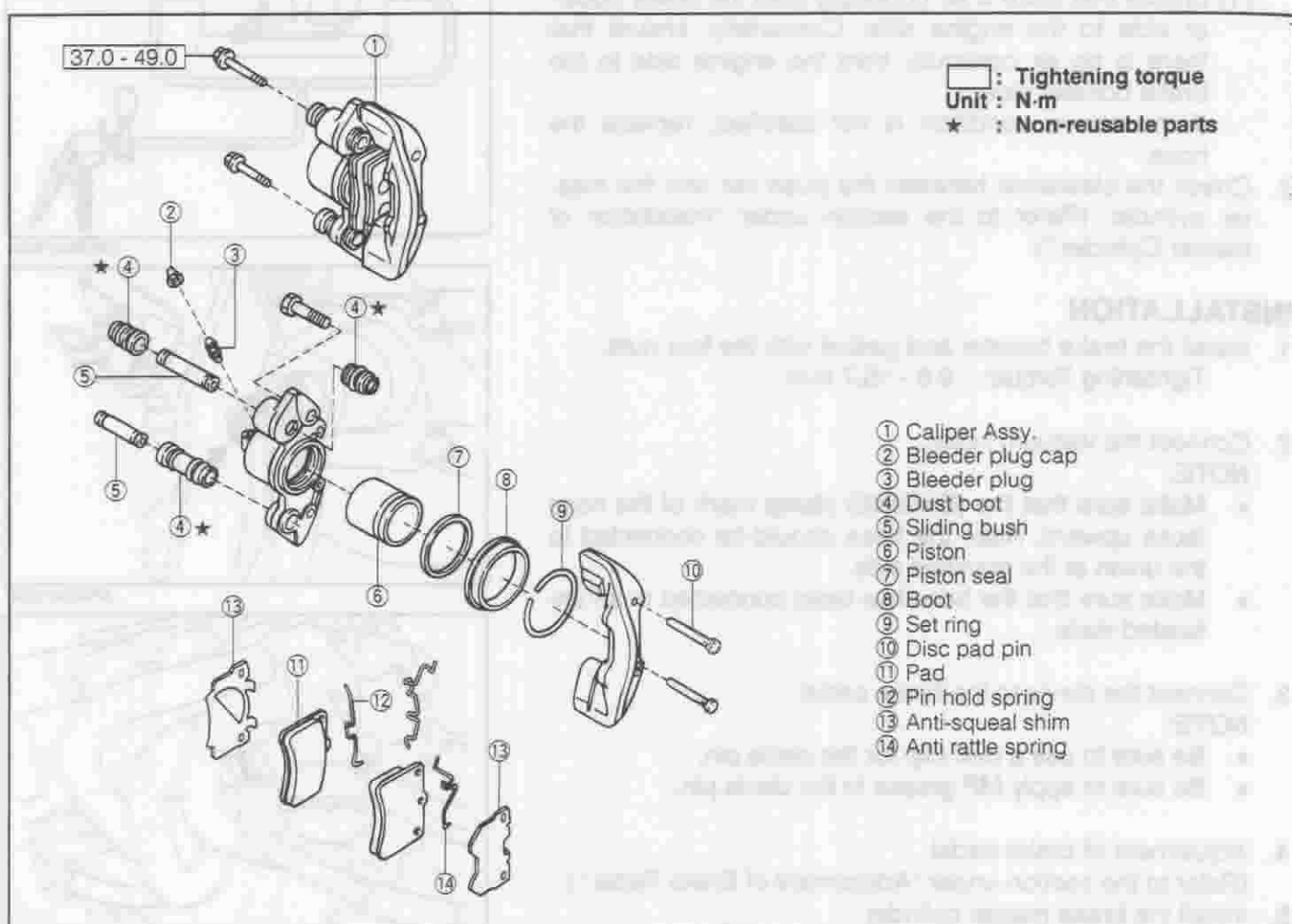


LBR00043-00041



LBR00000-00042

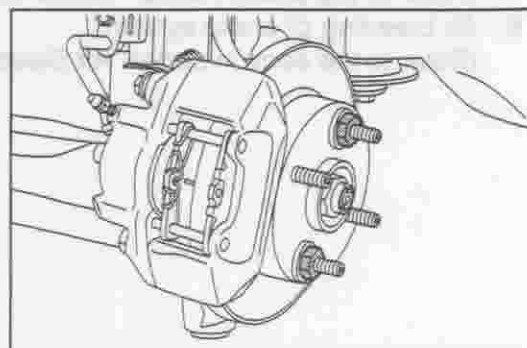
FRONT BRAKE COMPONENTS



LBR00044-00043

BRAKE PAD INSPECTION

1. Removal of front wheel
 - (1) Secure the disc by means of the hub nuts.

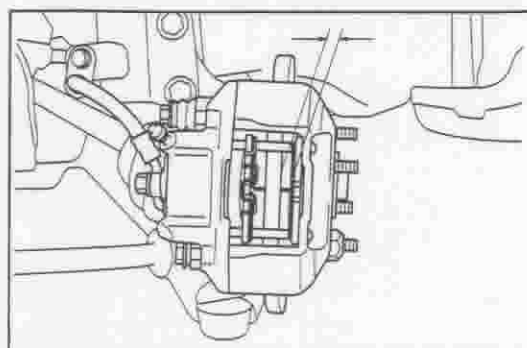


LBR00045-00044

2. Check of brake pad thickness
 - (1) Check the pad thickness from the front side of the caliper. If the thickness fails to meet the specified value, replace the pad.
Minimum Thickness: 1.0 mm

NOTE:

- Be sure to replace the right and left brake pads as a set.



LBR00046-00045

REPLACEMENT

1. Removal of brake pad
 - (1) Remove the pin hold spring.
 - (2) Remove the two disc pad pins and anti-rattle spring from the caliper.

- (3) Remove the brake pads (IN/OUT).

2. Installation of new pad

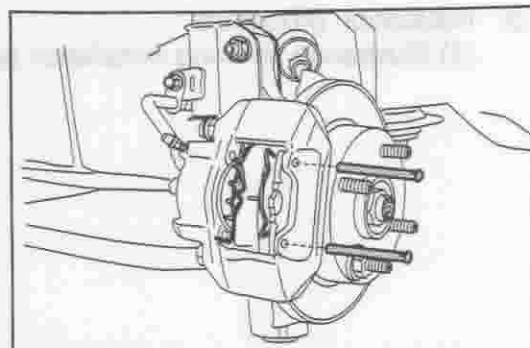
- (1) Loosen the mount bolt at the upper side.
- (2) Remove the bolt at the lower side and raise the caliper.
- (3) Push the piston into the cylinder by utilizing the grip of a hammer, etc.

- (4) Return the caliper to the original position and install the inner pad (with a wear indicator).
- (5) Set the anti-squeal shim to the pad and install it to the caliper.

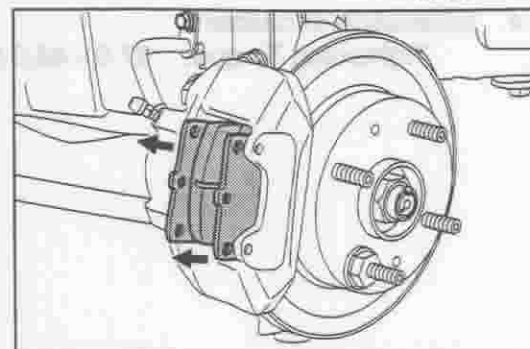
NOTE:

- Care must be exercised so that no grease and oil may get to the friction surface of the disc and pad.

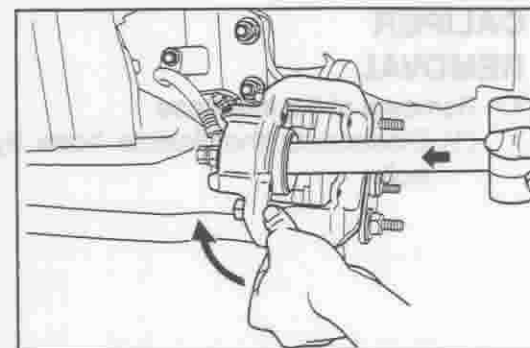
- (6) Install the anti-rattle spring, disc pad pins and pin hold spring.



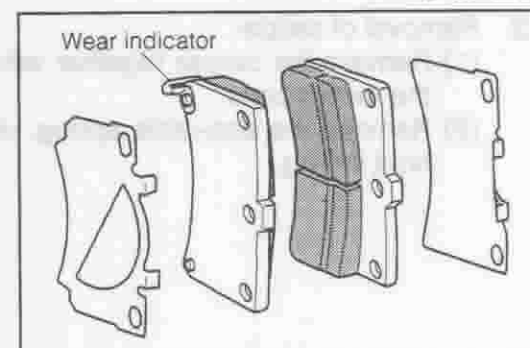
LBR00047-00046



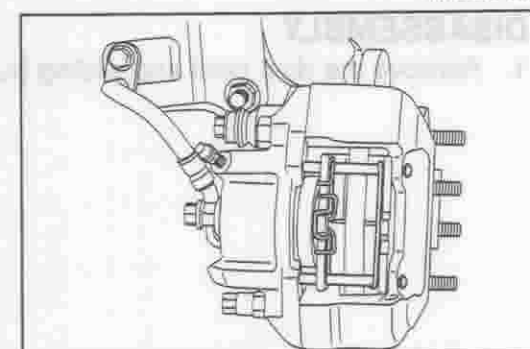
LBR00048-00047



LBR00049-00048



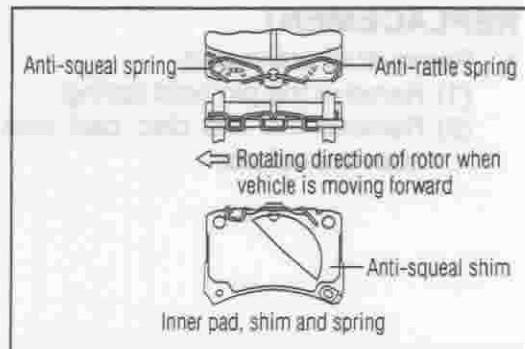
LBR00050-00049



LBR00051-00050

3. Installation procedure

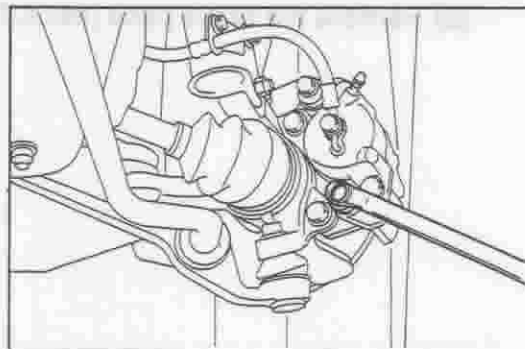
(1) Illustration showing installation procedure (R-H)



LBR00052-00051

4. Installation of caliper

Tightening Torque: 37.0 - 49.0 N·m

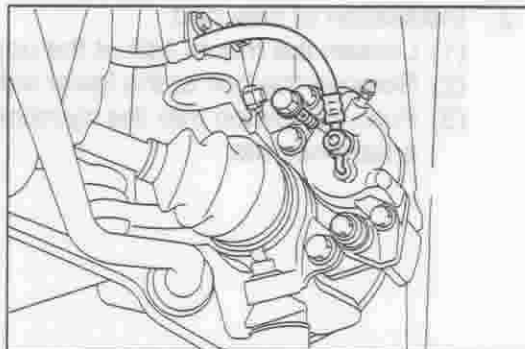


LBR00053-00052

CALIPER REMOVAL

1. Removal of flexible hose

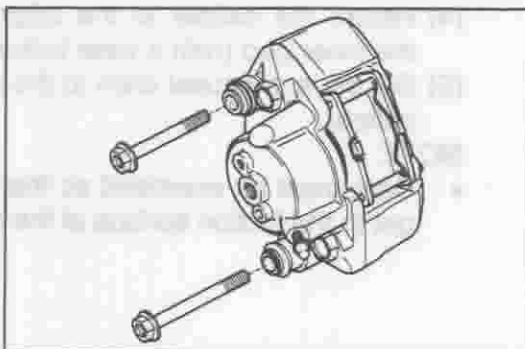
(1) Disconnect the flexible hose by loosening the union bolt.



LBR00054-00053

2. Removal of caliper

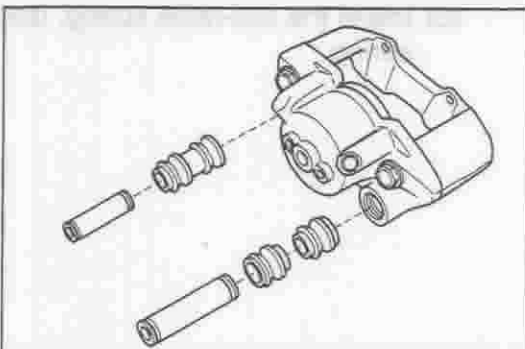
(1) Remove the caliper together with the pad by removing the mount bolts.
(2) Remove the anti-rattle spring, disc pad pins and pin hold spring.



LBR00055-00054

DISASSEMBLY

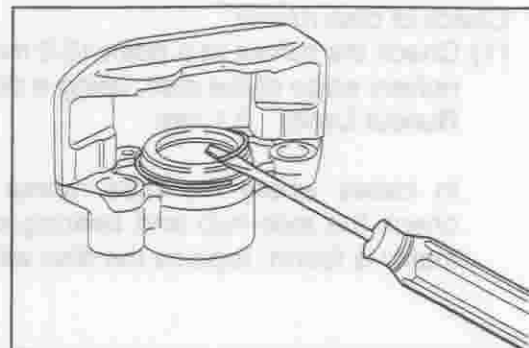
1. Remove the dust boot and sliding bush.



LBR00056-00055

2. Removal of cylinder boot set ring and cylinder boot

- (1) Detach the boot set ring and cylinder boot, using a screwdriver.



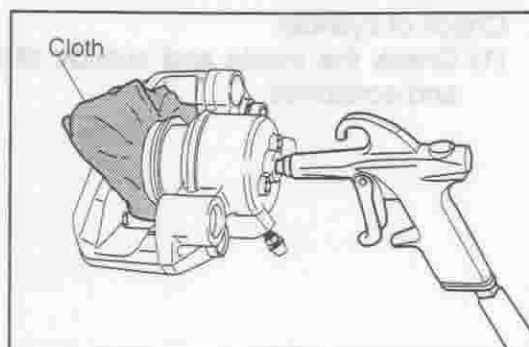
LBR00057-00056

3. Removal of piston

- (1) Prevent the piston from jumping out by placing a piece of cloth between the piston and the cylinder.
- (2) Slowly apply compressed air pressure from the brake hose connecting hole to take out the piston.

WARNING:

- Never put your fingers in front of the piston while using compressed air.



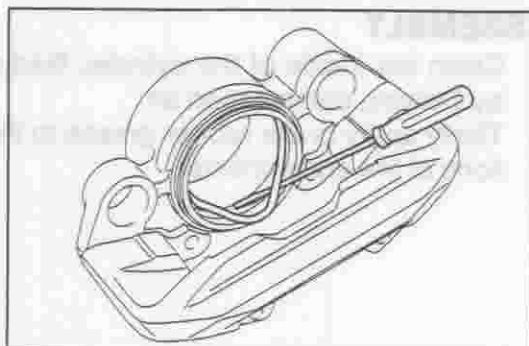
LBR00058-00057

4. Removal of piston seal

- (1) Remove the piston seal from the cylinder, using a screwdriver.

NOTE:

- Be very careful not to scratch the cylinder bore.



LBR00059-00058

INSPECTION

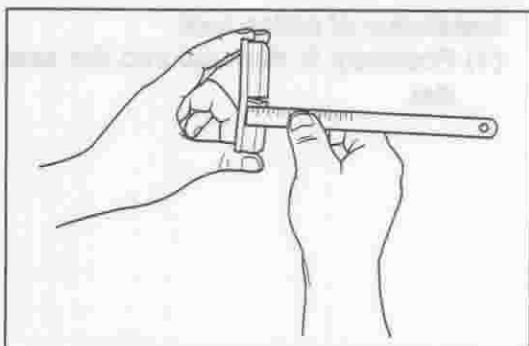
1. Check of brake pad

- (1) Measure the thickness of the lining, using a scale.

Specified Value: 10.0 mm

Use Limit: 1.0 mm

If the lining has been worn out beyond the use limit or the pad exhibits uneven wear, replace the pad with a new one.



LBR00060-00059

2. Check of disc

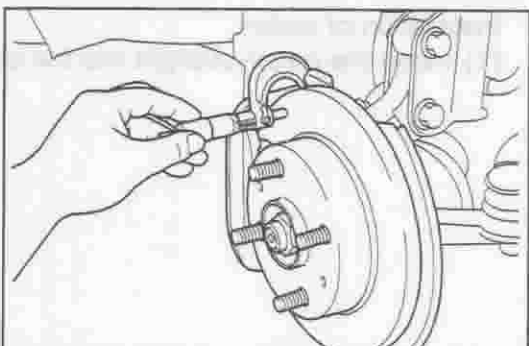
- (1) Check of disc thickness

Specified Value: 11.0 mm

Use Limit: 10.0 mm

Replace any disc that has been worn out beyond the use limit with a new one.

Grind or replace any disc exhibiting scratches or uneven wear.



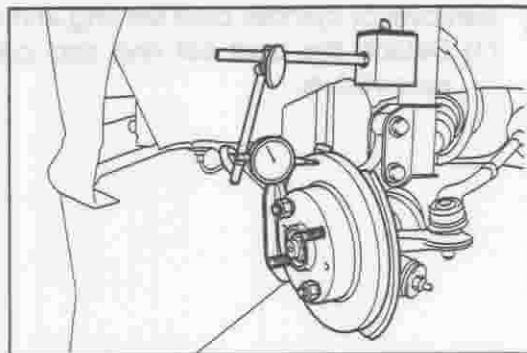
LBR00061-00060

3. Check of disc runout

- (1) Check the runout at a point 10.0 mm from the outer periphery edge of the disc, using a dial gauge.

Runout Limit: 0.1 mm

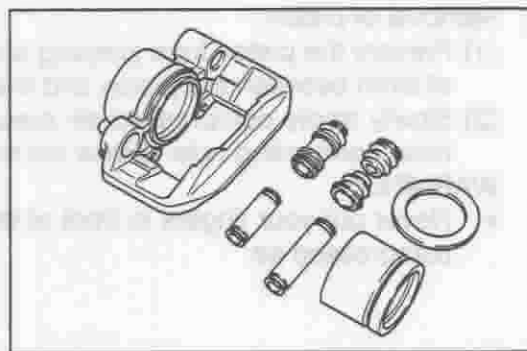
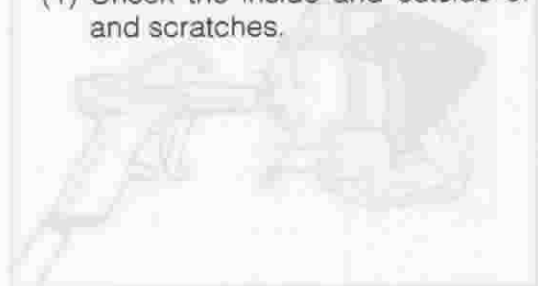
In cases where the disc runout exceeds the limit, check the axle hub and bearing as well. If no abnormality is found, replace the disc with a new one.



LBR00062-00081

4. Check of cylinder

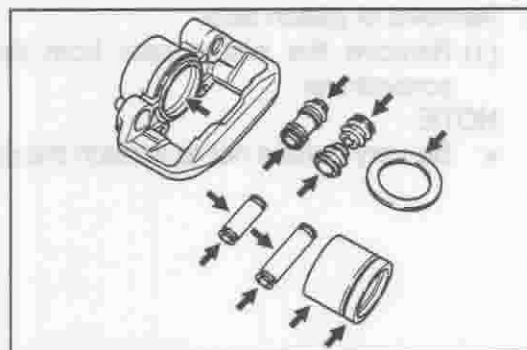
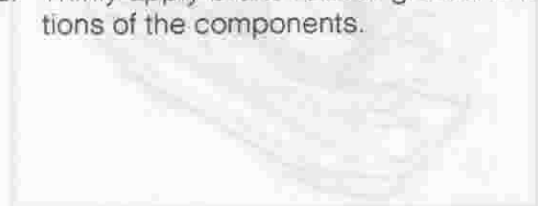
- (1) Check the inside and outside of the cylinder for rust and scratches.



LBR00063-00082

ASSEMBLY

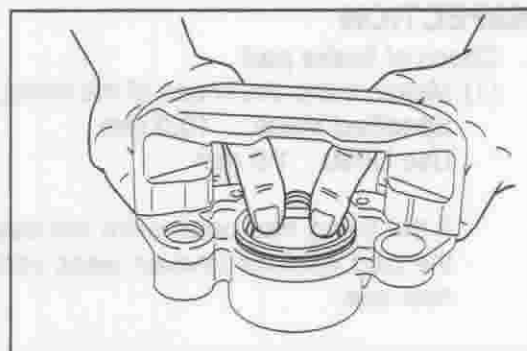
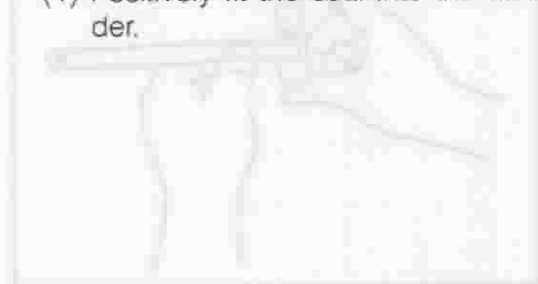
1. Clean the inside of the cylinder, fluid passage and piston by blowing compressed air.
2. Thinly apply brake rubber grease to the arrowheaded sections of the components.



LBR00064-00083

3. Installation of piston seal

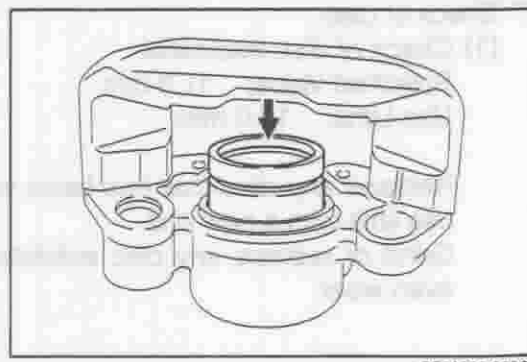
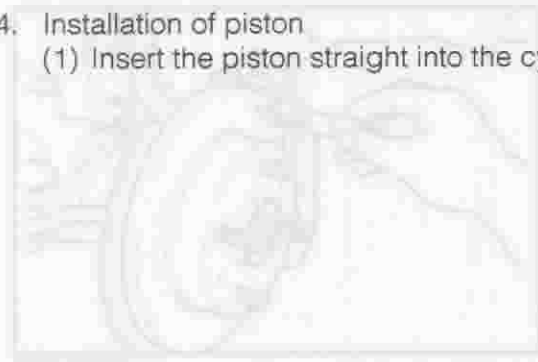
- (1) Positively fit the seal into the seal groove of the cylinder.



LBR00065-00084

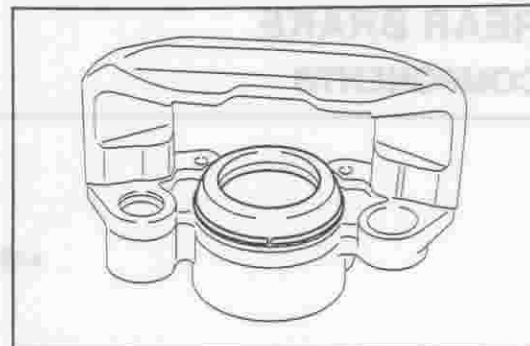
4. Installation of piston

- (1) Insert the piston straight into the cylinder.



LBR00066-00085

5. Installation of cylinder boot and set ring
 - (1) Install the boot and set ring to the cylinder.



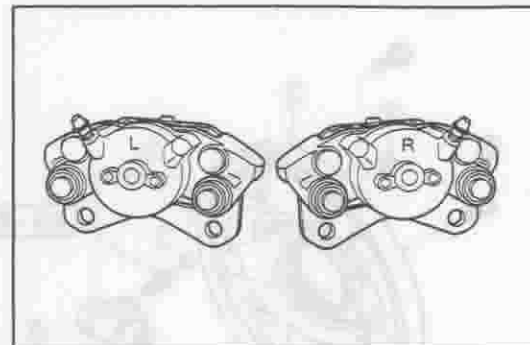
LBR00067-00066

INSTALLATION

NOTE:

- Reverse the removal procedure to install the caliper. (Refer to the section under "Brake Pad Inspection & Replacement.")

1. Installation of caliper
 - (1) Install the caliper, while making sure that the right and left calipers come at the correct side by observing the embossed letters.
2. Installation of flexible hose
 - (1) Tighten the union bolt with a new gasket interposed.
Tightening Torque: 26.5 - 34.3 N·m



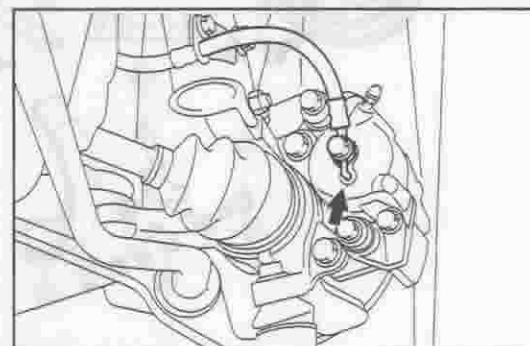
LBR00068-00067

NOTE:

- Make sure that the flexible hose lock is positively fitted into the lock hole during the installation.

CAUTION:

- Make sure that the flexible hose has been installed in an untwisted state.
- Turn the steering wheel from lock to lock position. Make sure that the flexible hose is not interfering with other parts.

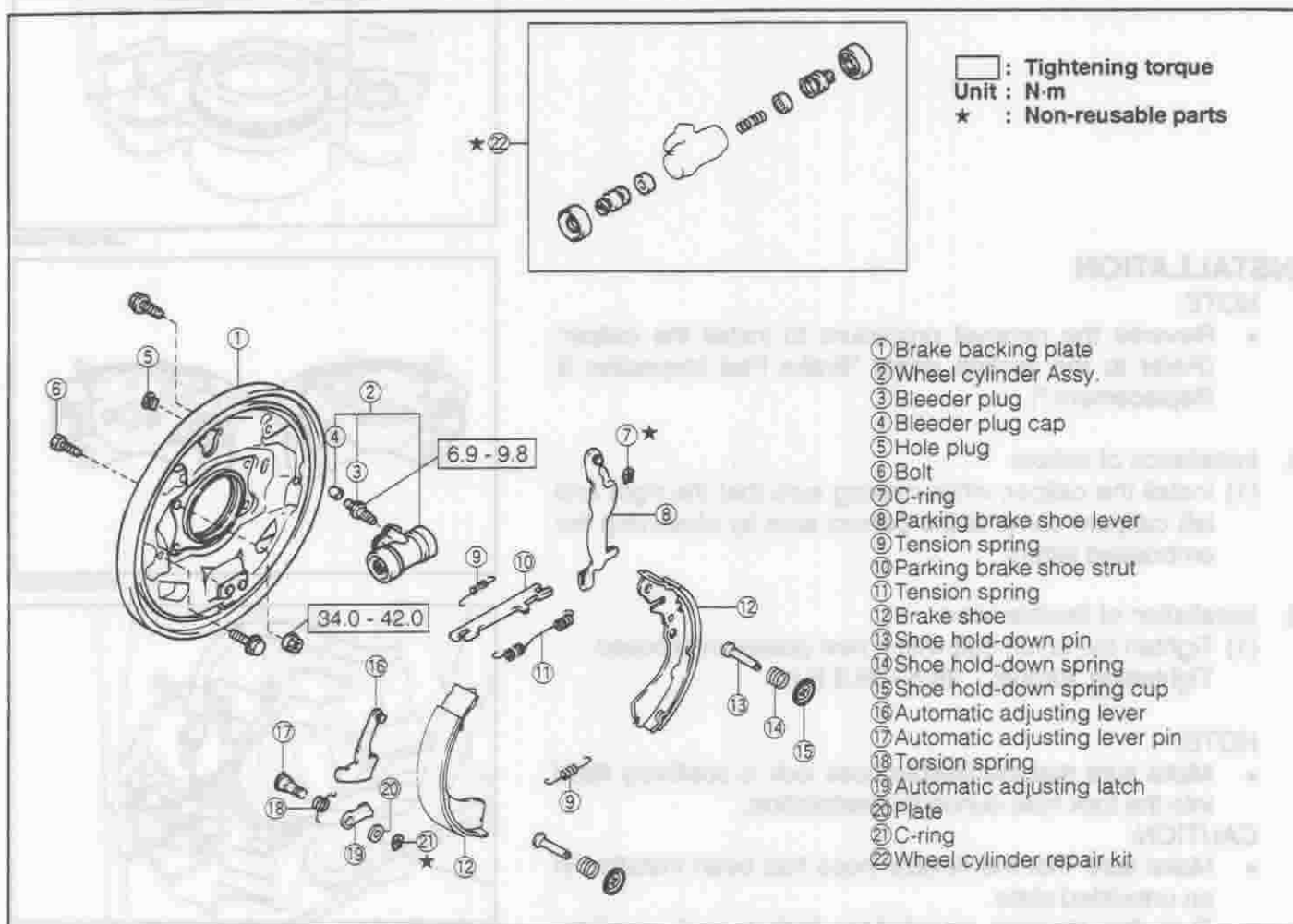


LBR00069-00068

3. Air bleeding of brake system
 - (1) Fill the brake reservoir tank with fluid. Perform air bleeding.
(Refer to the section under "Air Bleeding.")
4. Check the brake system for leakage.

LBR00070-00069

REAR BRAKE COMPONENTS



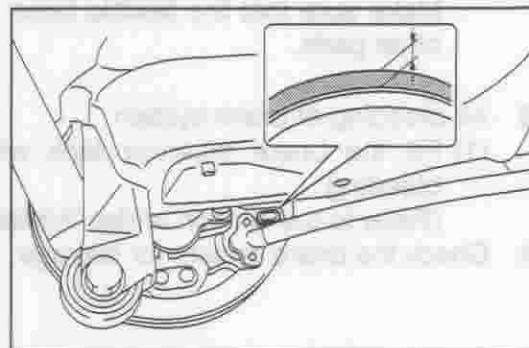
LBR00071-00069

INSPECTION

- Check of brake shoe lining for thickness
 - Remove the hole plug of the backing plate.
 - Check the thickness through the inspection hole.
Minimum Thickness: 1.0 mm

If the thickness is the minimum thickness or less, replace the shoe.

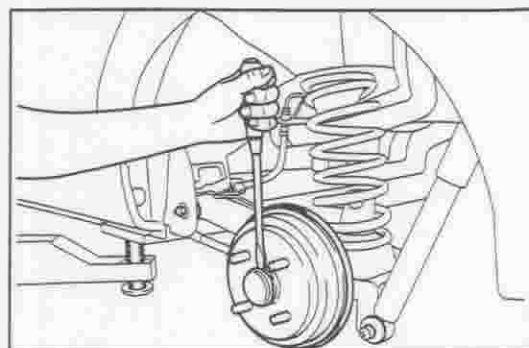
- Positively install the hole plug.



LBR00072-00070

REMOVAL

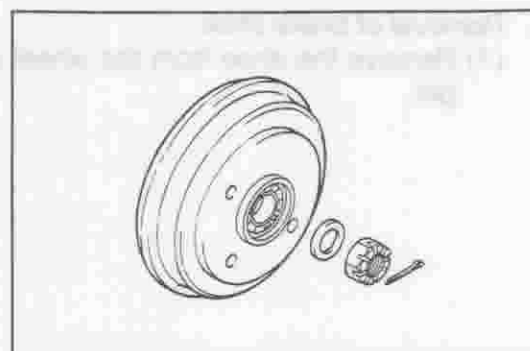
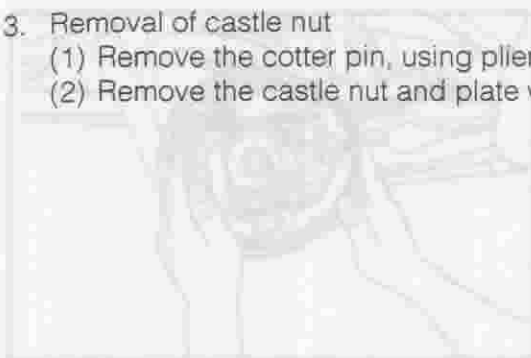
- Remove the rear wheel.
- Remove the grease cap, using an integral handle screwdriver.



LBR00073-00071

3. Removal of castle nut

- (1) Remove the cotter pin, using pliers.
- (2) Remove the castle nut and plate washer.

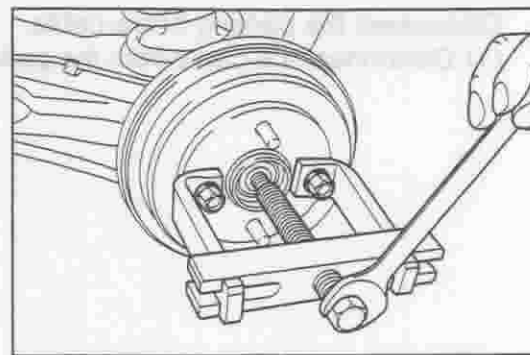
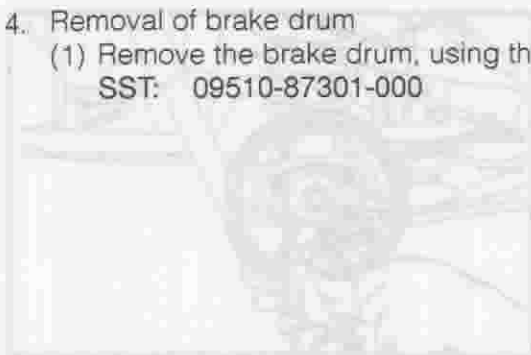


LBR00074-00072

4. Removal of brake drum

- (1) Remove the brake drum, using the following SST.

SST: 09510-87301-000



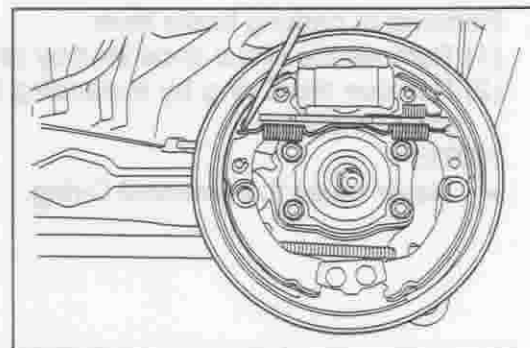
LBR00075-00073

5. Removal of speed sensor (If equipped with ABS)

6. Removal of tension spring

- (1) Remove the tension spring, using the following SST.

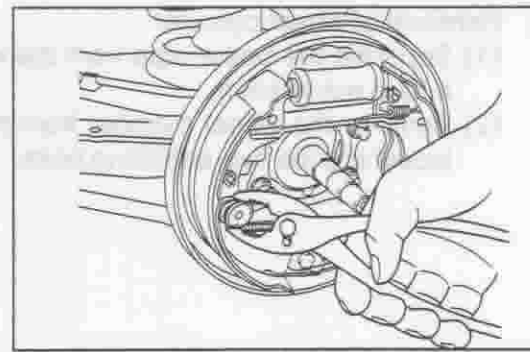
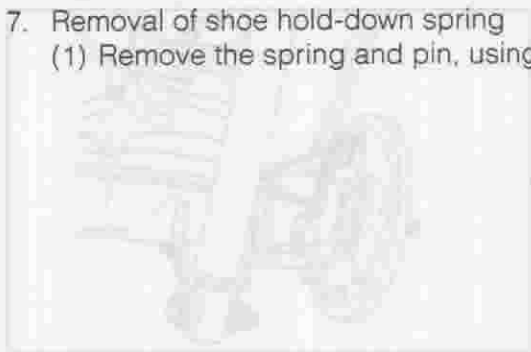
SST: 09703-30010-000



LBR00076-00074

7. Removal of shoe hold-down spring

- (1) Remove the spring and pin, using pliers.

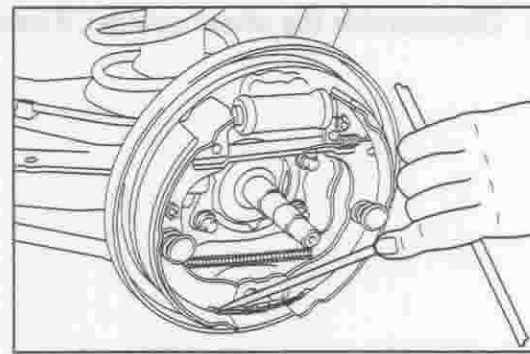


LBR00077-00075

8. Removal of tension spring (No. 2)

- (1) Remove the tension spring, using the following SST.

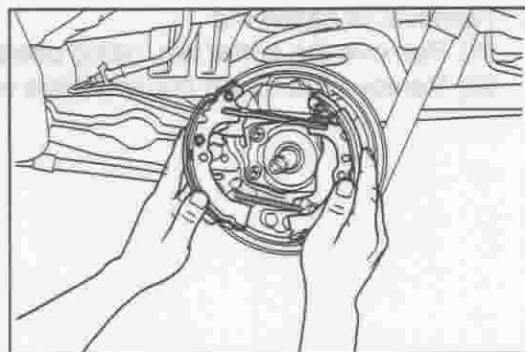
SST: 09703-30010-000



LBR00078-00076

9. Removal of brake shoe

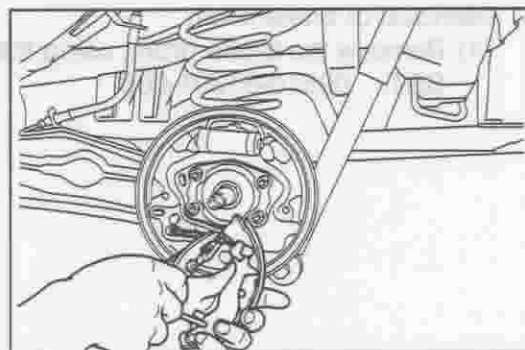
- (1) Remove the shoe from the wheel cylinder and anchor pin.



LBR00079-00077

10. Disconnect the parking brake cable.

- (1) Disconnect the cable from the parking brake lever.



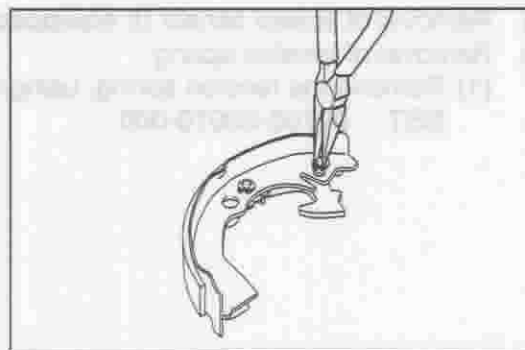
LBR00080-00078

11. Removal of parking brake lever

- (1) Remove the brake shoe strut by removing the spring.
- (2) Remove the C-ring by expanding it. Remove the parking brake lever.

NOTE:

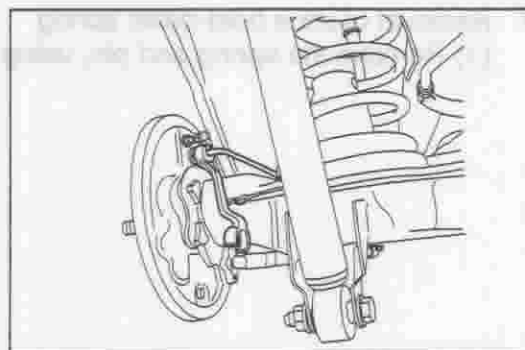
- Never reuse the removed C-ring.



LBR00081-00079

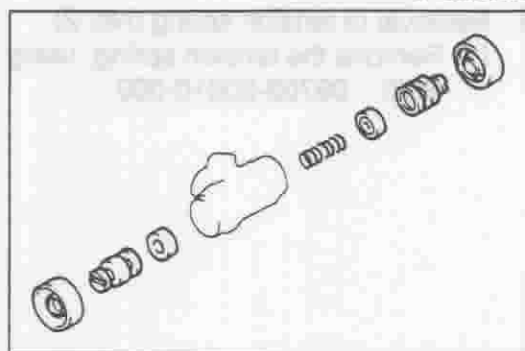
12. Removal of wheel cylinder

- (1) Separate the brake pipe from the wheel cylinder, using a flare nut wrench.
- (2) Remove the wheel cylinder from the backing plate by loosening the two attaching bolts.



LBR00082-00080

13. Disassemble the wheel cylinder, if necessary.



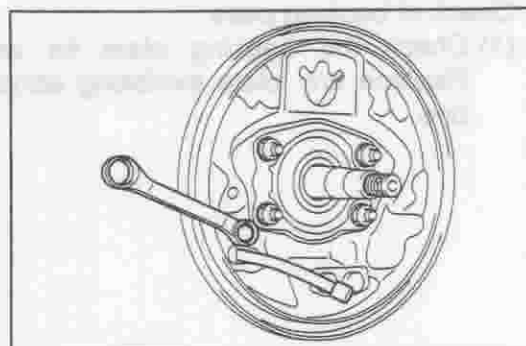
LBR00083-00081

4. Removal of backing plate

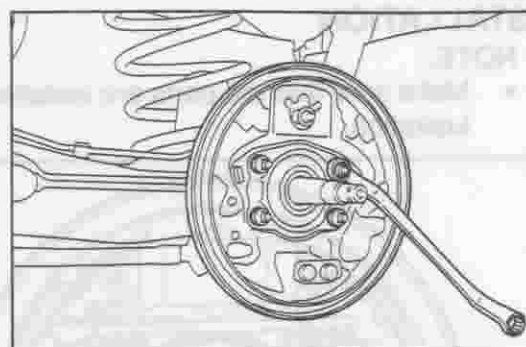
- (1) Disconnect the parking brake cable by removing the attaching bolt.



- (2) Remove the backing plate from the knuckle.



LBR00084-00082



LBR00085-00083

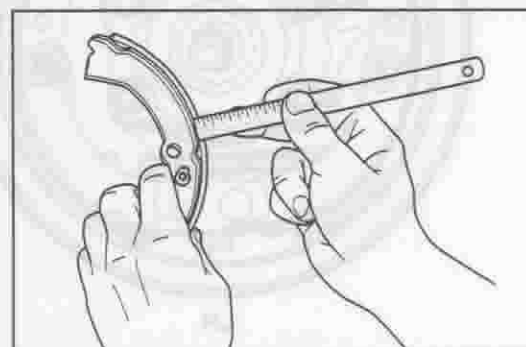
INSPECTION

1. Check the brake shoe lining for thickness.

Specified Value: 3.9 mm

Wear Limit: 1.0 mm

If the thickness exceeds the limit or the shoe exhibits uneven wear, replace the shoe with a new one.



LBR00086-00084

2. Check the brake drum bore diameter.

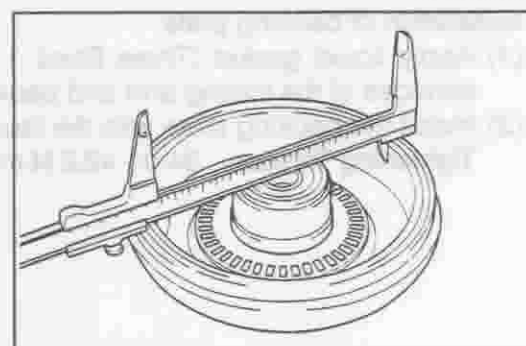
Specified Value: 165.0 mm

(ABS-equipped vehicles: 180.00 mm)

Wear Limit: 166.0 mm

(ABS-equipped vehicles: 181.00 mm)

If the bore diameter exceeds the limit, replace the drum with a new one.

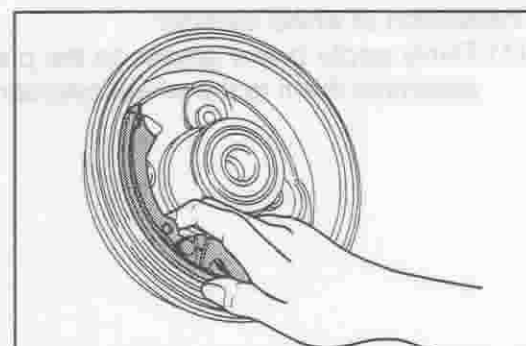


LBR00087-00085

3. Check of contacting condition of lining with drum

- (1) Check the contacting condition of the lining with the drum, using chalk powder.

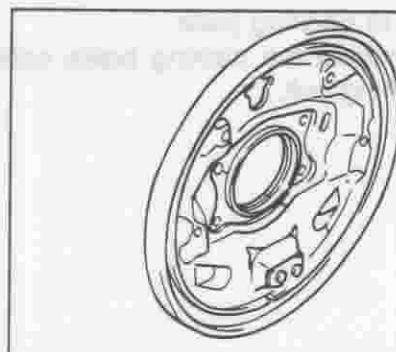
If the contacting condition is not correct, polish the lining, using a sand paper or the like.



LBR00088-00086

4. Check of backing plate

- (1) Check the backing plate for wear and damage. Replace any plate exhibiting abnormality with a new one.

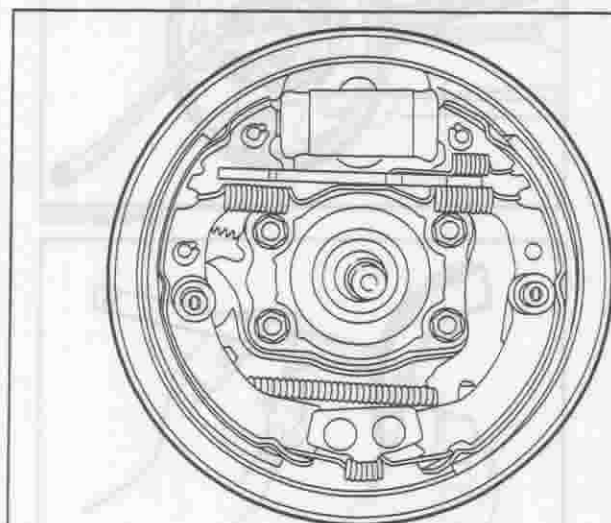


LBR00089-0008

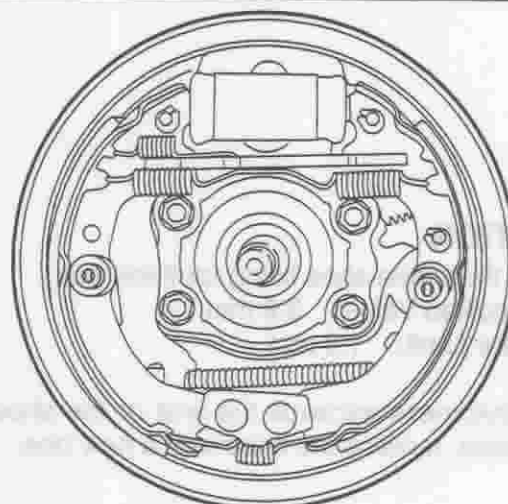
INSTALLATION

NOTE:

- Make sure that the parts are installed at the correct position in the correct direction, referring to the illustration.



LH



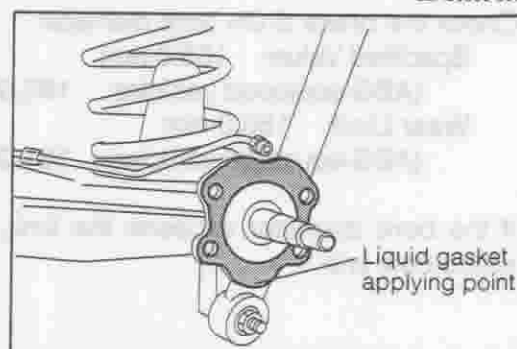
RH

LBR00090-0008

1. Installation of backing plate

- (1) Apply liquid gasket (Three Bond 1104) to the mating surfaces of the trailing arm and backing plate.
- (2) Install the backing plate with the four bolts.

Tightening Torque: 34.0 - 42.0 N·m

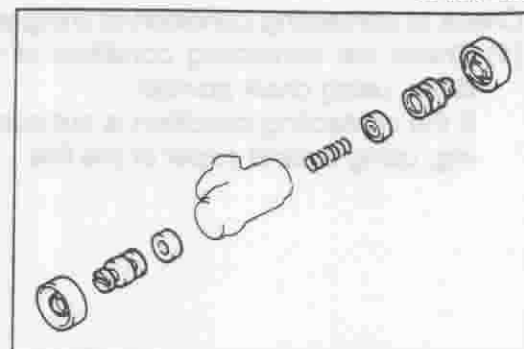


Liquid gasket
applying point

LBR00091-0008

2. Installation of wheel cylinder

- (1) Thinly apply brake grease to the piston, cup, etc. and assemble them to the wheel cylinder.



LBR00092-0009

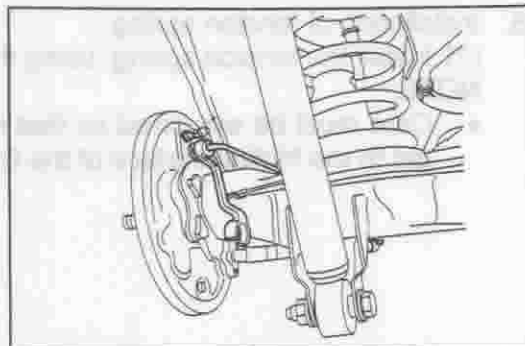
- (2) Install the wheel cylinder to the backing plate with the two nuts.

Tightening Torque: 7.8 - 11.7 N·m

3. Connection of brake pipe

- (1) Connect the brake pipe to the wheel cylinder, using a flare nut wrench.

Tightening Torque: 12.7 - 17.7 N·m

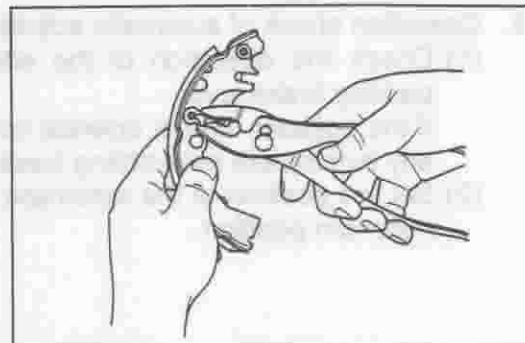


LBR00093-00091

4. Assembling of brake shoe

- (1) Install the automatic adjuster lever to the brake shoe.

- (2) Positively secure the pin, using a new C-ring.

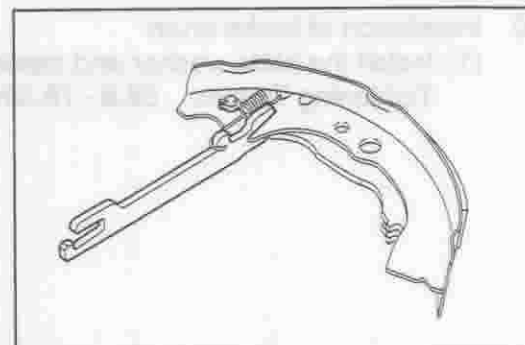


LBR00094-00092

5. Installation of parking brake shoe strut

- (1) Install the parking brake strut and parking brake lever.

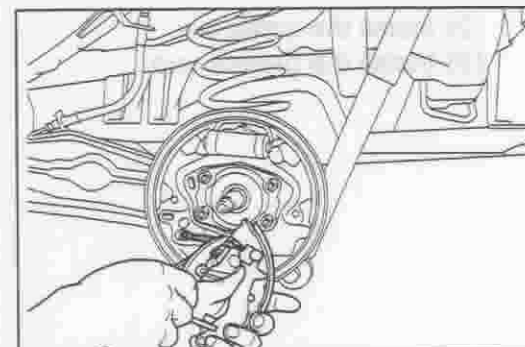
- (2) Positively secure the pin, using a new C-ring.



LBR00095-00093

6. Connection of parking brake cable

- (1) Connect the cable to the parking brake lever.

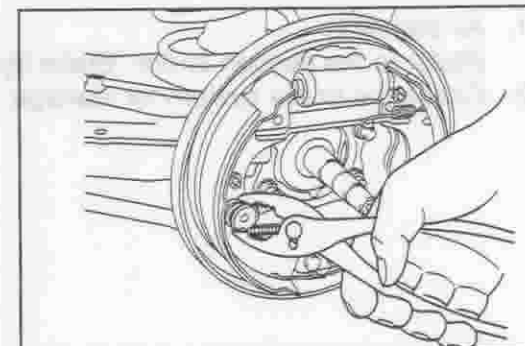


LBR00096-00094

7. Installation of front/rear brake shoe

- (1) Set the shoe between the wheel cylinder and the anchor pin.

- (2) Install the shoe hold-down spring, cup and pin.



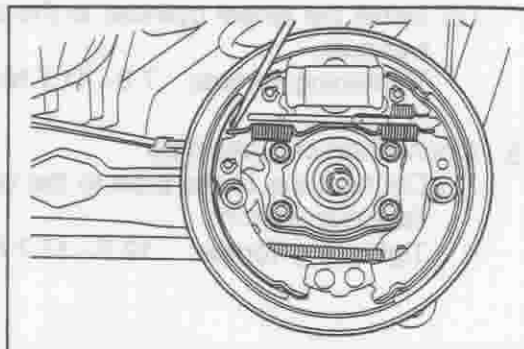
LBR00097-00095

8. Installation of tension spring

- (1) Install the tension spring, using the SST.

NOTE:

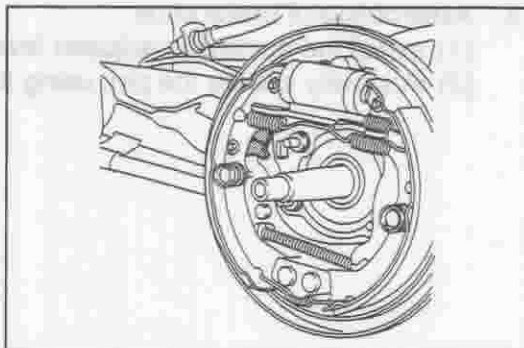
- Care must be exercised so that no oil and grease may get to the friction surface of the lining.



LBR00098-00096

9. Operation check of automatic adjusting mechanism

- (1) Check the operation of the adjuster by moving the parking brake lever.
If the adjuster will not operate normally, check to see if any incomplete assembling has been made.
- (2) Set the position of the automatic adjusting lever to the minimum position.

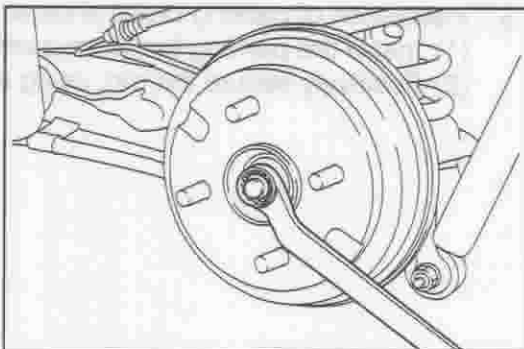


LBR00099-00097

10. Installation of brake drum

- (1) Install the plate washer and castle nut.

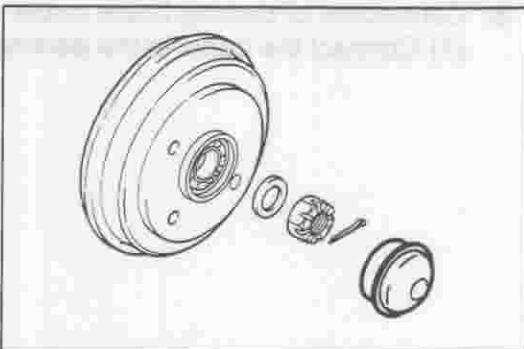
Tightening Torque: 58.8 - 78.5 N·m



LBR00100-00098

- (2) Install the cotter pin.

- (3) Install the grease cap.



LBR00101-00099

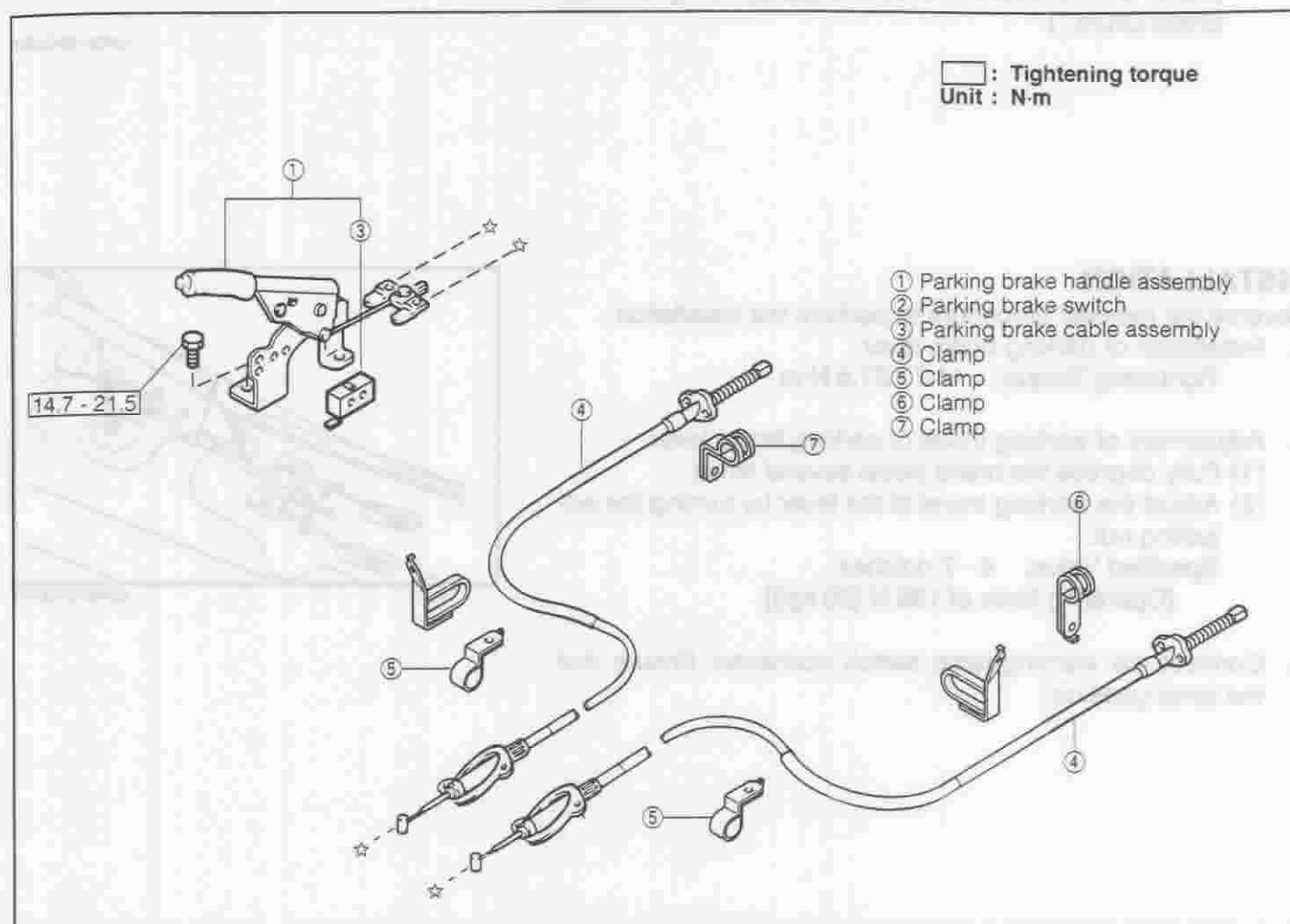
11. Air bleeding

(Refer to the section under "Brake System Air Bleeding.")

12. Check the brake system for leakage.

LBR00102-00000

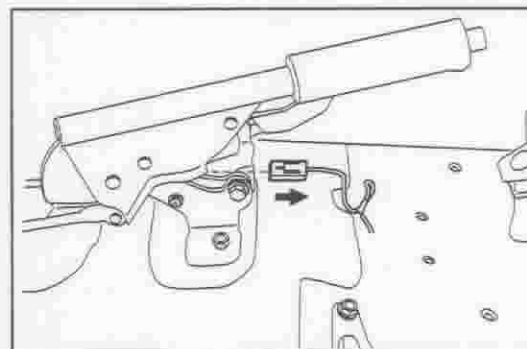
PARKING BRAKE COMPONENTS



LBR00103-00100

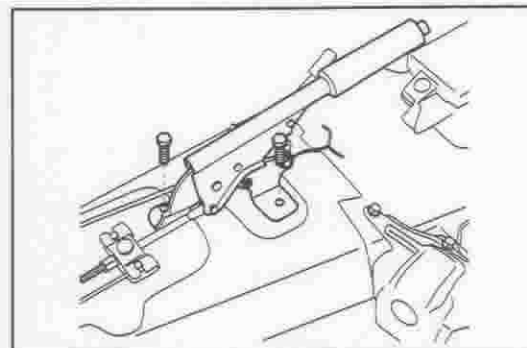
REMOVAL

1. Remove the console box.
(Refer to the BO section.)
2. Disconnect the brake warning lamp switch connector.



LBR00104-00101

3. Removal of parking brake lever
 - (1) Remove the lever from the floor by removing the two attaching bolts.



LBR00105-00102

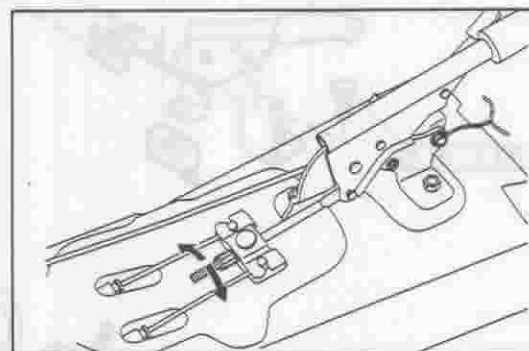
4. Disconnection of parking brake cable
 - (1) Disconnect the cable from the brake shoe.
(Refer to the section under "Disassembling of Rear Brake Drum.")

LBR00106-00000

INSTALLATION

Reverse the removal procedure to perform the installation.

1. Installation of parking brake lever
Tightening Torque: 14.7 - 21.5 N·m
2. Adjustment of working travel of parking brake lever
 - (1) Fully depress the brake pedal several times.
 - (2) Adjust the working travel of the lever by turning the adjusting nut.
Specified Value: 4 - 7 notches
[Operating force of 196 N (20 kgf)]
3. Connect the warning lamp switch connector. Ensure that the lamp goes on.



LBR00107-00103



REMOVAL

and release the lever.
[Remove the cable and the lever.]

Remove the cable and the lever.

Remove the cable and the lever.

Remove the cable and the lever.

Remove the cable and the lever.

PROPORTIONING VALVE

INSPECTION

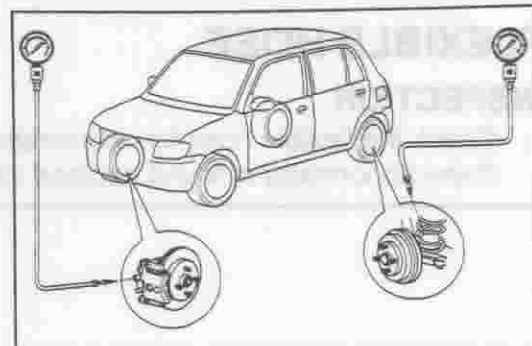
- Function check of P valve
 - Remove the bleeder plugs of the right front wheel and left rear wheel.

(2) Install a pressure gauge to each bleeder hole.

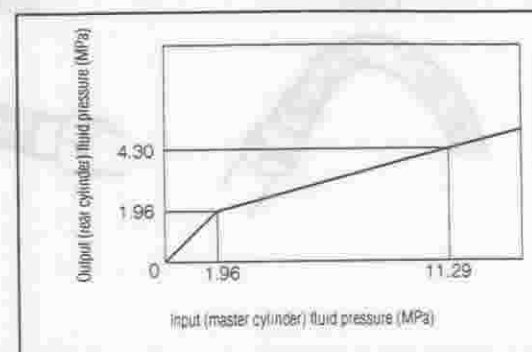
NOTE:

- Be sure to perform the air bleeding of the gauge.

- With the brake pedal depressed, check the hydraulic pressure of the front and rear wheels.



LBR00108-00104



LBR00109-00105

- Remove the gauge. Perform air bleeding for each cylinder. (Refer to the section under "Air Bleeding.")
- Fill the reservoir tank with brake fluid up to the MAX line.

LBR00110-00000

REPLACEMENT

- Disconnection of brake tube
 - Disconnect the brake tube from the proportioning valve, using a flare nut wrench.

- Remove the proportioning valve by removing the attaching bolts.

NOTE:

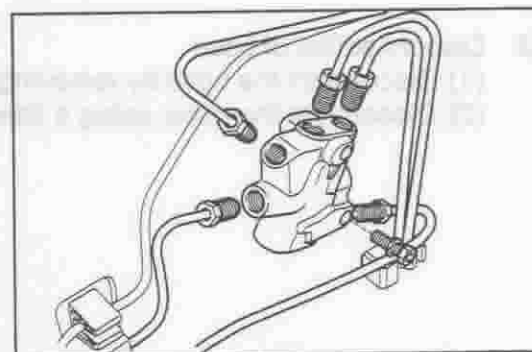
- If brake fluid gets to the paint-finish surface, be sure to immediately wash it with water.

INSTALLATION

- Install a new proportioning valve with the attaching bolts.
Tightening Torque: 5.9 - 8.8 N·m

- Connect the brake tube to the proportioning valve.
Tightening Torque: 12.7 - 17.7 N·m

- Perform air bleeding for the brake system. (Refer to the section under "Air Bleeding.")

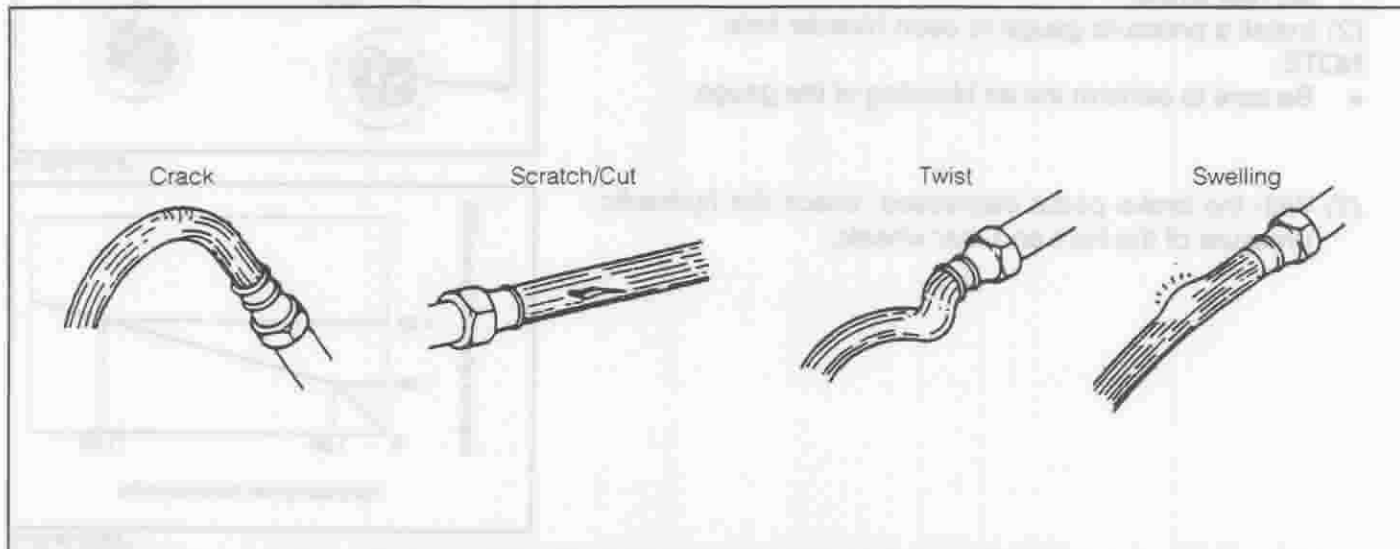


LBR00111-00106

FLEXIBLE HOSE

INSPECTION

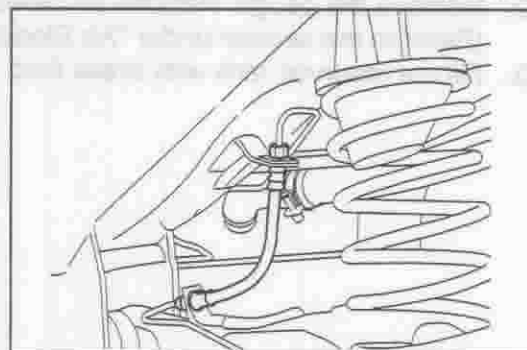
1. Check the flexible hose for deterioration, damage and twist.
If any abnormality is found, replace the hose with a new one.



LBR00112-00107

REPLACEMENT

1. Drain the fluid from the brake system.
(Receive the brake fluid in a container.)
2. Disconnect the brake pipe from the hose, using a flare nut wrench.



LBR00113-00108

3. Disconnection of hose
 - (1) Disconnect the hose by removing the E-ring.
 - (2) Disconnect the hose, using a flare nut wrench.



LBR00114-00109

4. Connection of hose
 - (1) Connect the hose at the pipe side and at the clamp side.

NOTE:

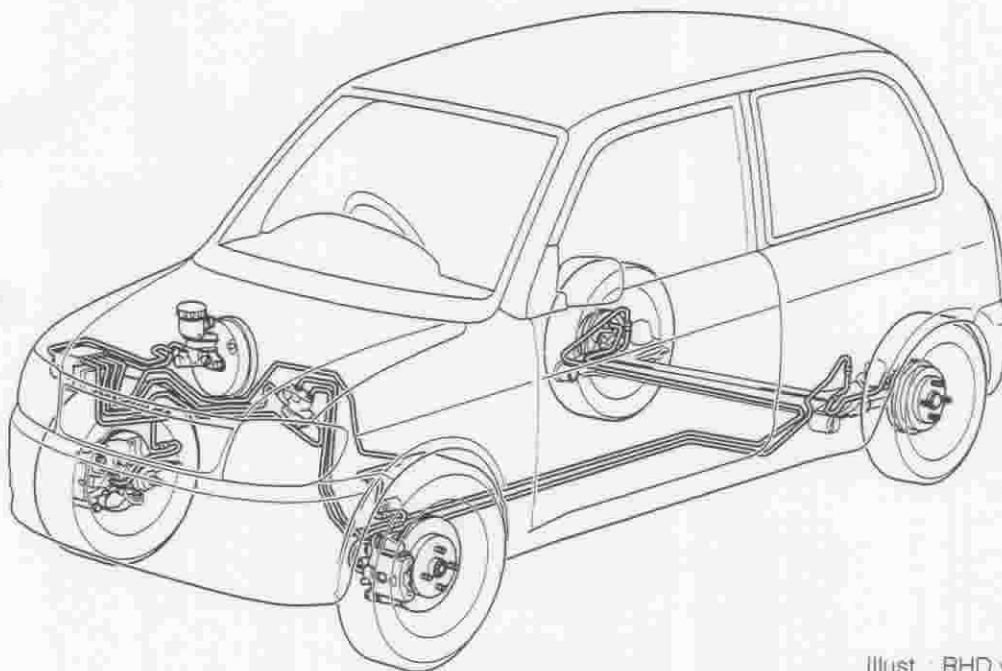
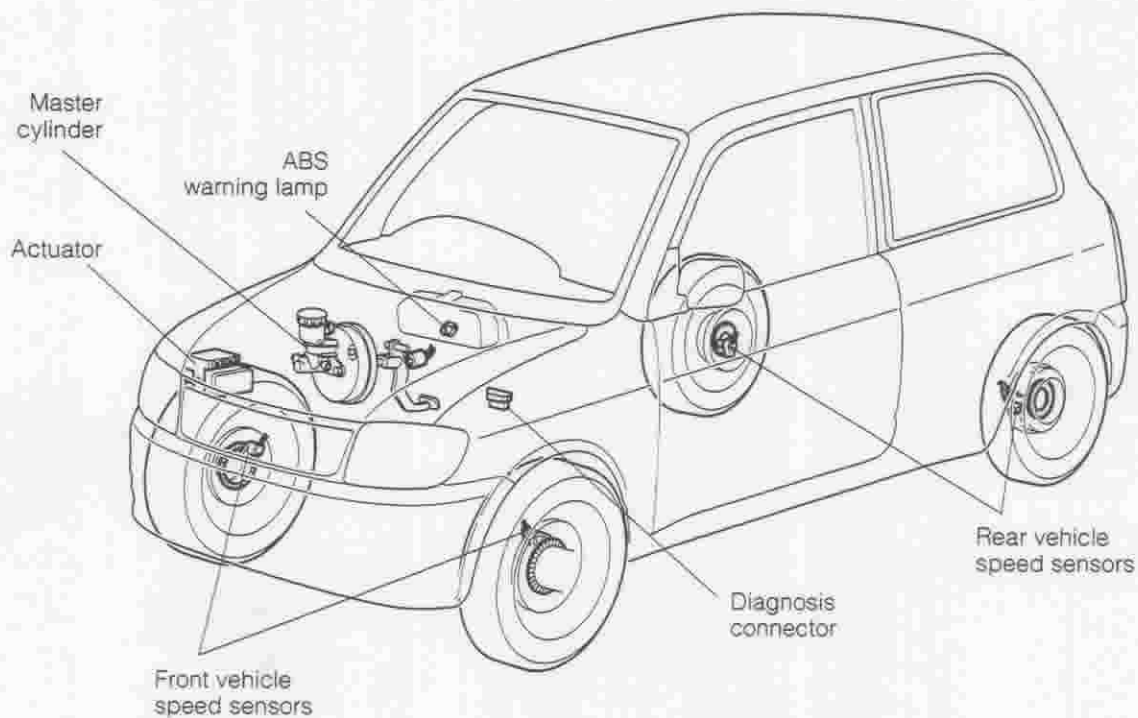
- First, tighten the flare nut temporarily by hand. Then, tighten it, using a flare nut wrench.
Tightening Torque: 12.7 - 17.7 N·m

LBR00115-00000

ANTI-LOCK BRAKE SYSTEM

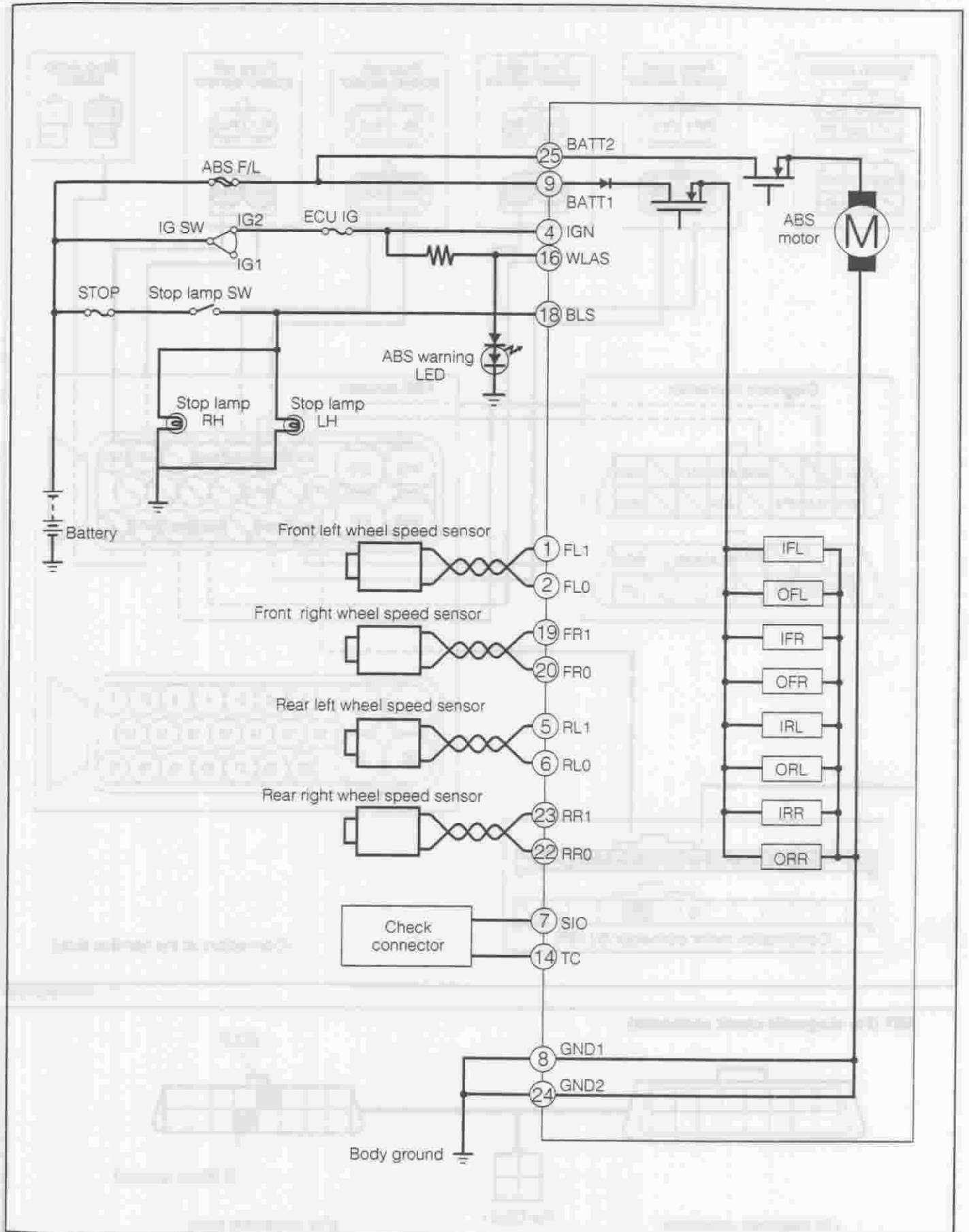
OUTLINE OF SYSTEM

The ABS is a brake system to prevent the wheels from locking which may cause the vehicle to slip. For this purpose, the ABS assures proper braking forces at all times by maintaining the coefficient of friction between the tires and the road surface to an optimum level through controlling the hydraulic pressure of each of the front right, front left and rear wheels. In this way, the controllability or steerability of the steering wheel is assured even under sudden braking/hard braking, except for the case of over-speeding or sharp turning in a corner.

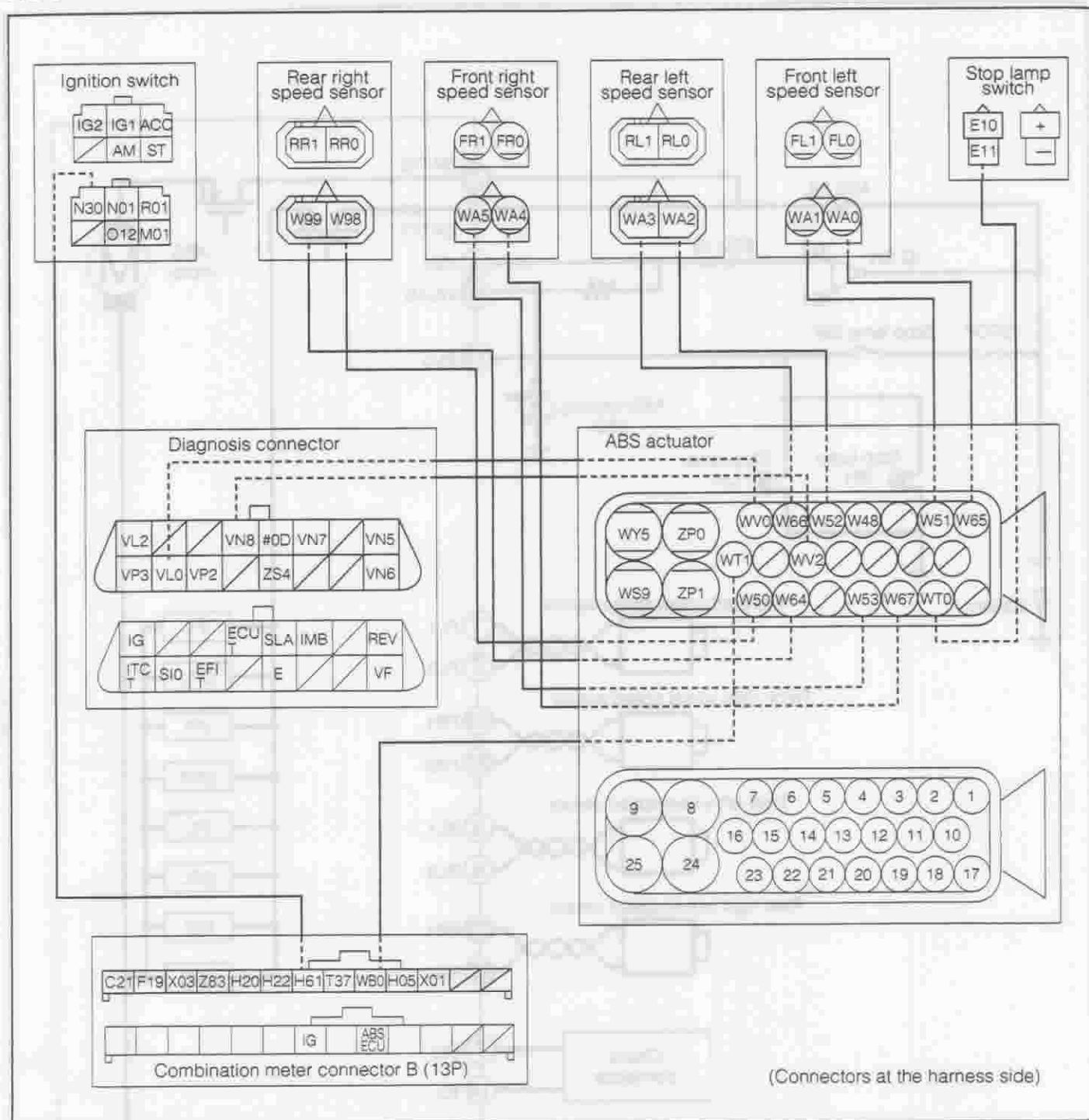


ABS CIRCUIT DIAGRAM

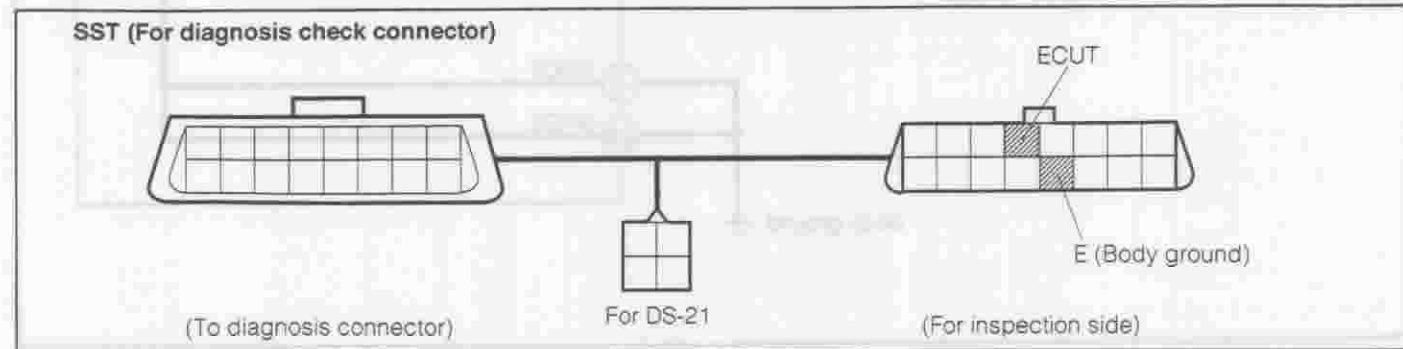
ABS-RELATED COMPONENTS



ABS-RELATED CONNECTORS



LABS00003-00003



LABS00000-00004

ABS CIRCUIT CONNECTION TABLE

No.	ABS actuator unit		Wheel speed sensor				Stop lamp switch		
	Abbreviation code	Terminal of ABS actuator unit to be connected	Front		Rear		Ignition switch		
			Right	Left	Right	Left	ABS fuse		
							Diagnosis check connector		
									Others
1	FL1 (W51)	Speed sensor (Front left)	○	○					
2	FL0 (W65)	Speed sensor (Front left)	○	○					
4	IGN (W48)	Ignition switch	○				○		
5	RL1 (W66)	Speed sensor (Rear left)	○			○			
6	RL0 (W52)	Speed sensor (Rear left)	○			○			
7	SIO (WV0)	External communication circuit (Diagnosis check connector)	○					○	
8	GND1 (ZP0)	Ground	○						○ Body ground
9	BATT1 (WY5)	ABS fuse	○				○		
14	TC (WV2)	Diagnosis check connector	○					○	
16	WLAS (WT1)	ABS warning lamp	○						○ Combination meter
18	BLS (WT0)	Stop lamp switch	○				○		
19	FR1 (W53)	Speed sensor (Front right)	○	○					
20	FR0 (W65)	Speed sensor (Front right)	○	○					
22	RR0 (W50)	Speed sensor (Rear right)	○			○			
23	RR1 (W64)	Speed sensor (Rear right)	○			○			
24	GND2 (ZP1)	Body ground	○						○ Body ground
25	BATT2 (WS9)	Battery	○				○		

LABS00004-00000

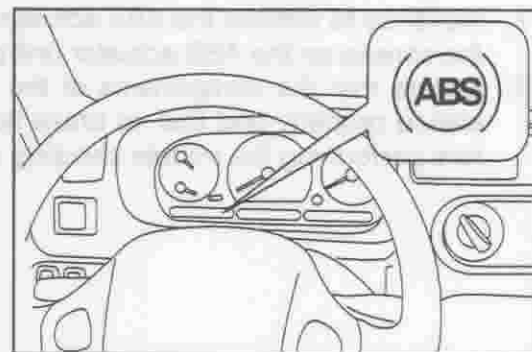
PRECAUTIONS

- The ABS system has a self-diagnosis function. The ECU in the ABS actuator unit memorizes abnormality as diagnosis codes which are occurring at present or occurred in the past.

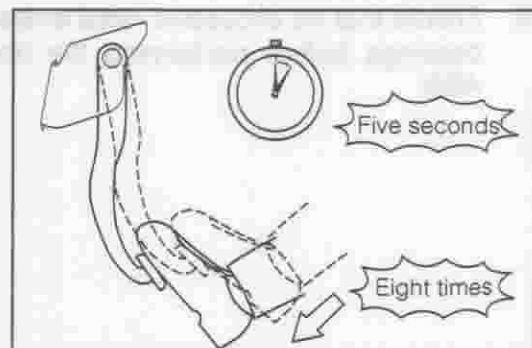
Memorized diagnosis codes are erased when the brake pedal is depressed eight times or more within predetermined form. Therefore, no diagnosis code will be erased even when the battery power supply is shut off.

NOTE:

- Be sure to perform the sensor check by sensor check function after erasing the diagnosis code.



LABS00005-00005

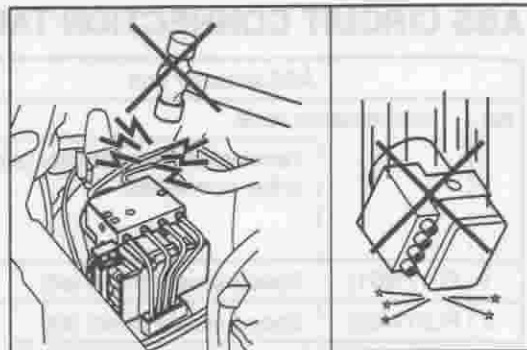


LABS00006-00006

2. The components of the ABS system are precise and delicate. Therefore, never apply any excessive impact during the removal, inspection and installation.

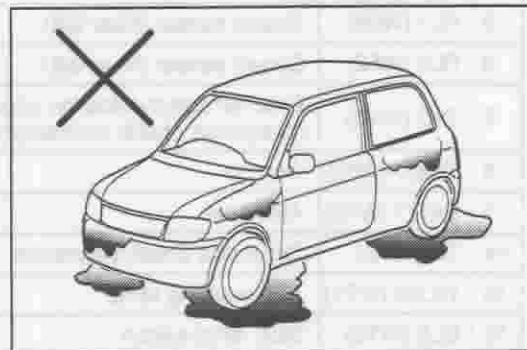
CAUTION:

- Never use components to which an impact has been applied by dropping or hitting with other objects.



LABS00007-00007

3. Never perform the inspection of the ABS system when the vehicle is wet, such as after running in rain or snow and after washing, in order to prevent water or dust, etc. from being admitted into the ABS and related connectors.
4. Never allow water and dust, etc. to enter into the ABS actuator unit and related connectors.
5. Prevent water from coming in contact with the ABS related parts and connectors during washing.



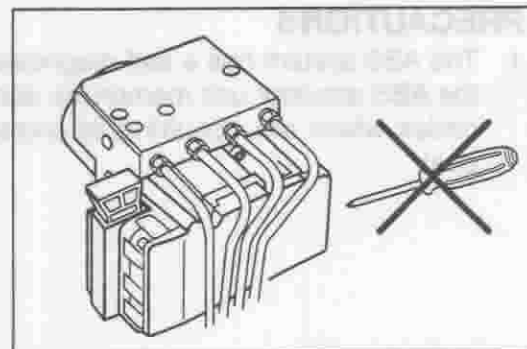
LABS00008-00008

6. Prior to replacing the ABS actuator unit, thoroughly perform the trouble shooting for possible items other than the ABS actuator unit. The ABS actuator unit is a reliable, but an expensive part.

Even when the ABS actuator unit is replaced according to the check results of the trouble shooting and the relevant trouble has been remedied, be sure to reinstall the old ABS actuator unit so as to confirm that the malfunction was obviously caused by the faulty ABS unit.

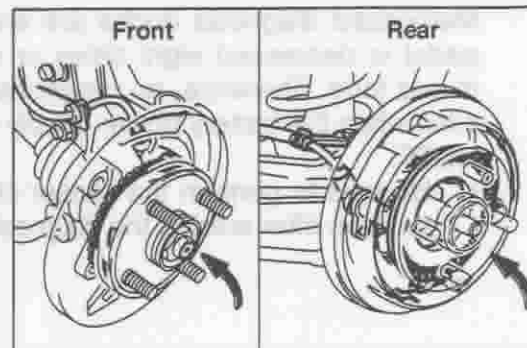
LABS00009-00000

7. Never try to remove the ABS actuator unit cover and touch the screws on the ABS actuator unit proper.
8. Ensure that the components of the brake system are installed properly and that no brake fluid leakage exists before performing the trouble shooting of the ABS.



LABS00010-00009

9. Ensure that no excessive rattle exists on each of the wheel bearings before performing the trouble shooting of the ABS.



LABS00011-00010

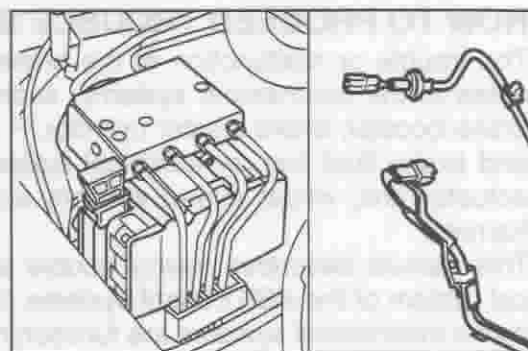
10. When installing a wireless installation (Telephone, HAM, CB, etc.) :
The ABS actuator unit has been so designed that it is resistant to external influence. However, if a vehicle is equipped with a wireless installation, such as CB, HAM, telephone and so forth, (even if its output is only 10 Watts) it may affect the ABS actuator unit adversely. Therefore, observe the following precautions.

- Install the antenna at a place as far away as possible from the ABS actuator unit and related harnesses.
- The antenna cord should be kept at least 30 cm from the ABS actuator unit and its related harnesses.
- The antenna cord should not be routed in parallel to ABS related harnesses.
- Adjust the antenna output correctly.
- Never install a wireless installation with a high output into the vehicle.
- Never use or place a handy telephone near the components of the ABS and its related harnesses.

LABS00012-00000

11. When disconnecting or connecting connectors:

- Prevent dust, water and foreign material, etc. from being admitted into the ABS-related connectors when disconnecting or connecting the connectors. Failure to observe this caution may cause serious malfunction, due to lowering the insulation of each terminal.
- Never damage or lose the seal of connectors during disconnection or connection.
- Be sure to confirm the shape of the lock and release the lock properly before disconnecting the connectors.

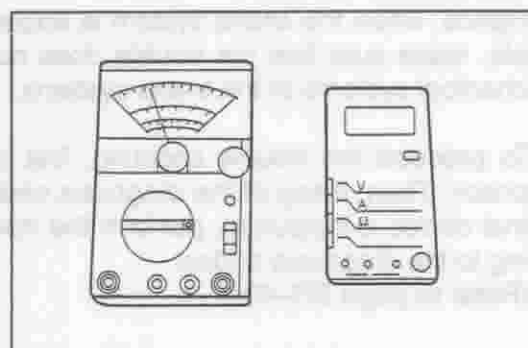


LABS00013-00011

12. Circuit tester

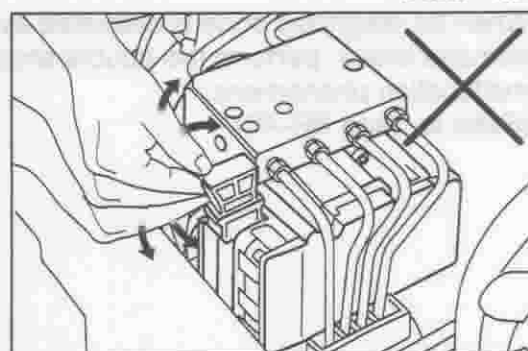
- For trouble shooting, use a volt/ohmmeter whose internal resistance is more than 10 k ohm, whose resolution is 0.1 V or more and 0.5 ohm or more, and whose accuracy is $0 \pm 2\%$ or more.

Use of a volt/ohmmeter which has lower specifications than those described above for trouble shooting may lead to wrong diagnosis or mis-judgement.



LABS00014-00012

13. Never deform the terminals of connectors by applying an excessive force when checks are performed by attaching the probe electrodes of the volt/ohmmeter to the terminals.
14. Be sure to disconnect the ground cable from the negative terminal of the battery before disconnecting the connector of the wire harness from the ABS actuator unit. Failure to observe this caution may lead to ABS unit damage.



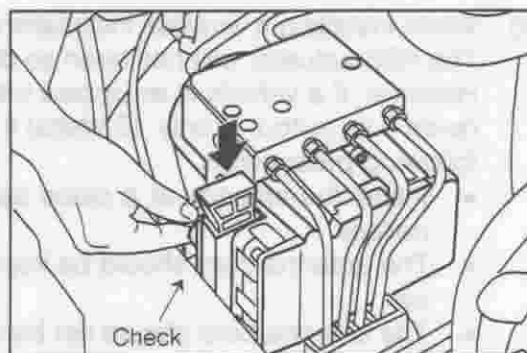
LABS00015-00013

TROUBLE SHOOTING HINTS

Most of troubles related to the electrical system of the ABS are merely caused by poor connections.

Ensure the following points carefully before and during the inspection.

1. Visually inspect that the terminals are not damaged or bent.
2. Ensure that connectors are securely connected and locked.
3. Ensure that the measured continuity or resistance will not be changed when light vibration is applied to the connector or the wire harness connected to the related circuit of presumable parts of trouble.



LABS00016-00014

HOW TO PROCEED TROUBLE SHOOTING

The trouble or malfunction of the brake system mainly originates in the mechanical systems, such as the brake pedal, brake booster, brake master cylinder, P valve, wheel cylinders and brake fluid line, or electrical systems, such as the ABS actuator unit, wheel speed sensors and ABS related wiring harness.

This manual describes mainly trouble shooting of the electrical system of the ABS control systems on the premise that the brake mechanical systems are functioning normally.

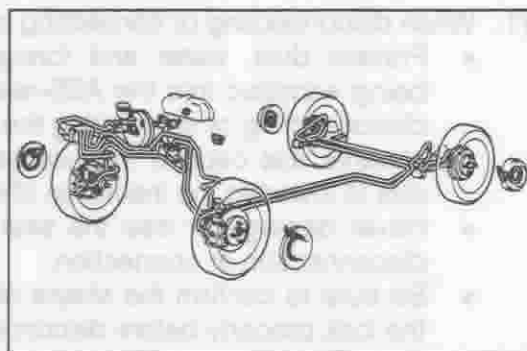
Hence, when the brake system is encountered with any trouble, make sure that the trouble does not originate in the mechanical systems of the brake systems.

To proceed the trouble shooting, first perform the diagnosis check. Then, if any of the diagnosis codes other than the normal codes is outputted, perform the trouble shooting according to the diagnosis codes.

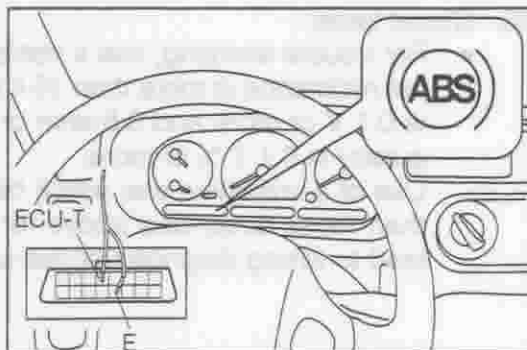
(Refer to page BR-40.)

When no diagnosis code is outputted even if malfunction phenomena exists, perform the trouble shooting according to the malfunction phenomena.

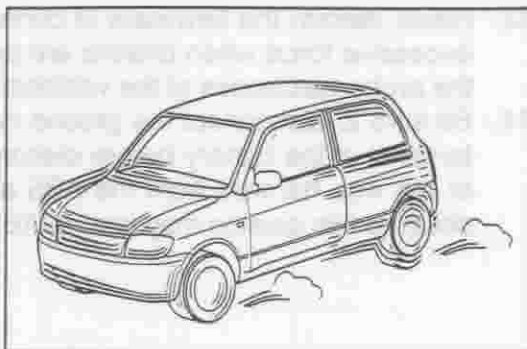
(Refer to page BR-46)



LABS00017-00015



LABS00018-00016

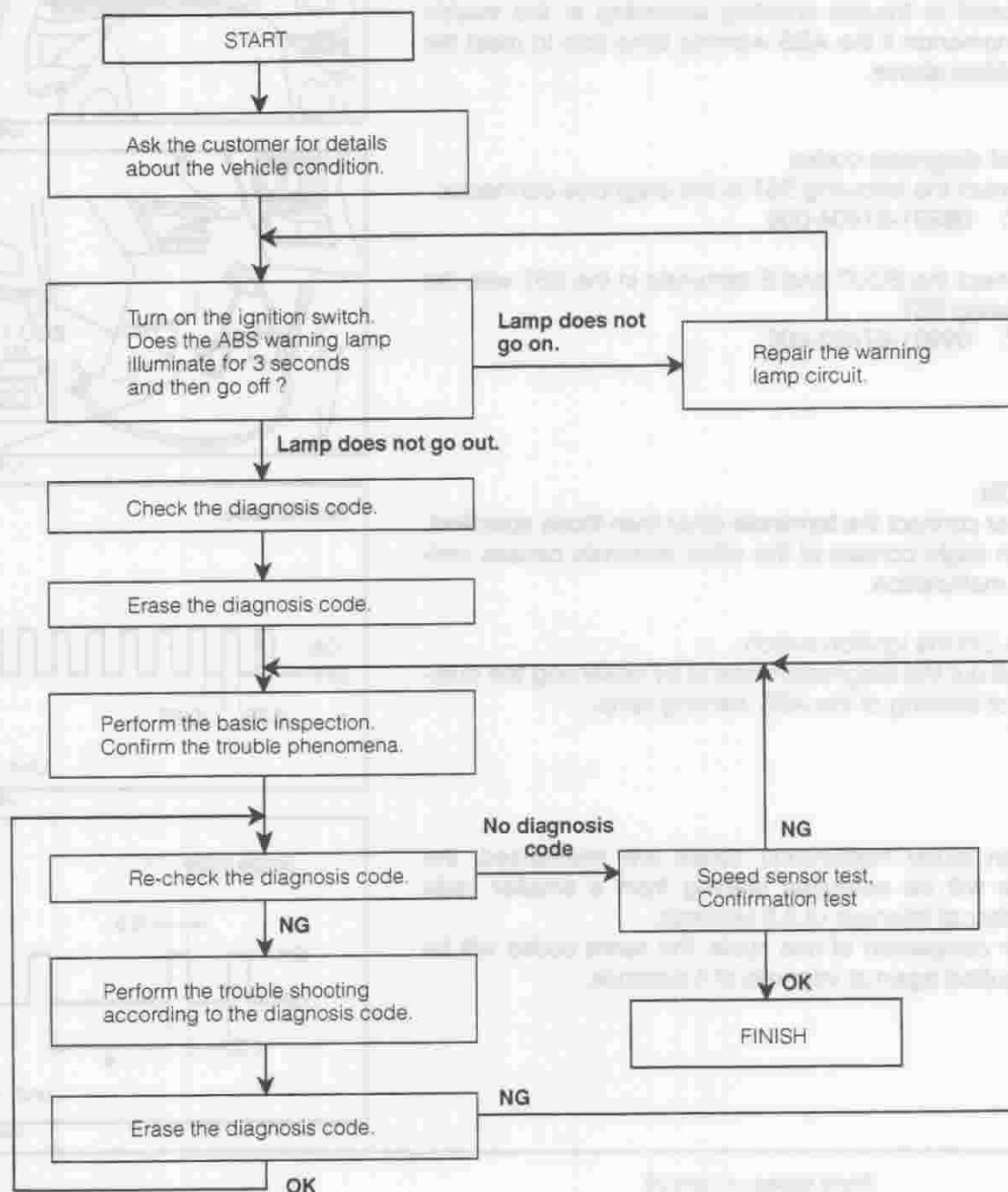


LABS00019-00017

The following diagram shows the basic procedure for the trouble shooting. Actual approach may differ if you have much experience on this system. However, it is recommended to perform the trouble shooting according to this procedure.

LABS00020-00000

TROUBLE SHOOTING FLOW CHART



LABS00021-00000

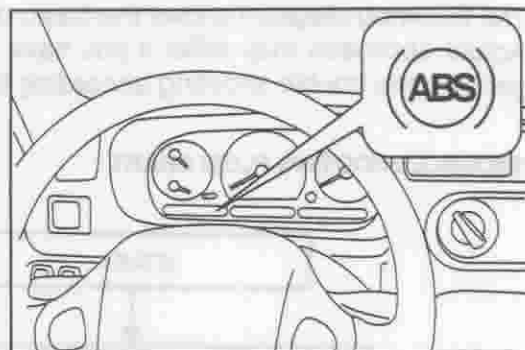
DIAGNOSIS CODE CHECK

1. Checking of ABS warning lamp

- (1) Ensure that the ABS warning lamp will glow for about three seconds after the ignition switch is turned ON, and, then, the warning lamp goes out.

NOTE:

- Proceed to trouble shooting according to the trouble phenomenon if the ABS warning lamp fails to meet the condition above.



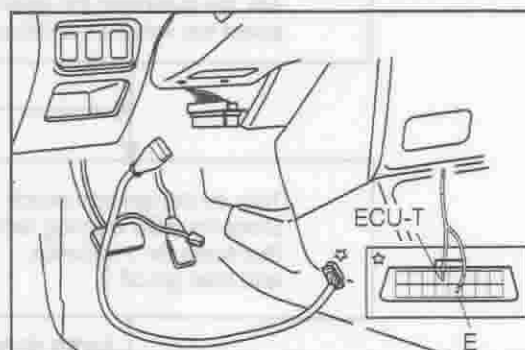
LABS00022-00018

2. Output of diagnosis codes

- (1) Connect the following SST to the diagnosis connector.
SST: 09991-87404-000

- (2) Connect the ECUT and E terminals in the SST with the following SST.

SST: 09991-87403-000



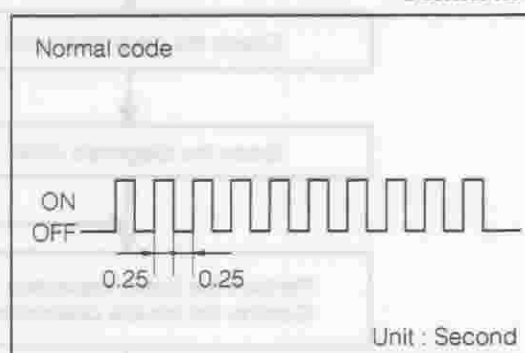
LABS00023-00019

CAUTION:

- Never connect the terminals other than those specified. Even slight contact of the other terminals causes serious malfunction.

- (3) Turn ON the ignition switch.

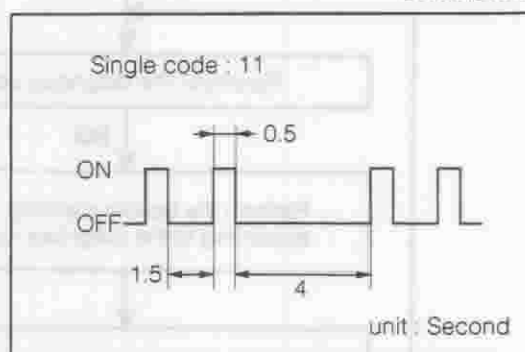
- (4) Read out the diagnosis code(s) by observing the number of blinking of the ABS warning lamp.



LABS00024-00020

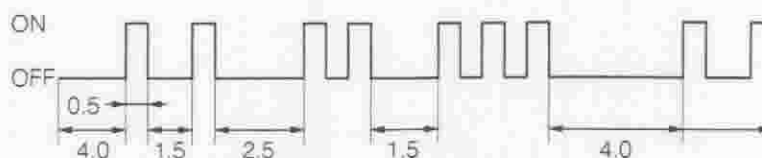
NOTE:

- When plural malfunction codes are memorized, the code will be outputted starting from a smaller code number at intervals of 2.5 seconds.
- After completion of one cycle, the same codes will be outputted again at intervals of 4 seconds.



LABS00025-00021

Plural codes : 11 and 23



unit : Second

LABS00000-00022

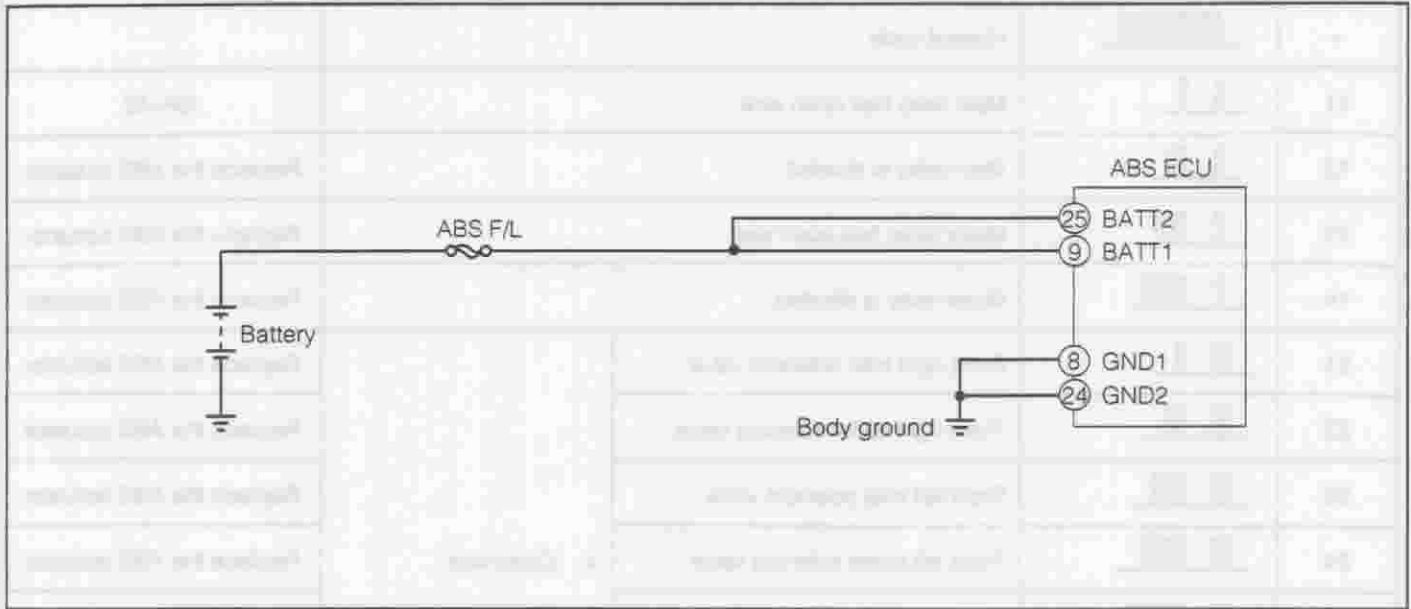
DIAGNOSIS CODE TABLE

Code No.	Warning lamp output	Diagnosis malfunction contents	Refer to page
-		Normal code	
11		Main relay has open wire.	BR-42
12		Main relay is shorted.	Replace the ABS actuator.
13		Motor relay has open wire.	Replace the ABS actuator.
14		Motor relay is shorted.	Replace the ABS actuator.
21		Front right inlet solenoid valve	Replace the ABS actuator.
22		Front right outlet solenoid valve	Replace the ABS actuator.
23		Front left inlet solenoid valve	Replace the ABS actuator.
24		Front left outlet solenoid valve	Replace the ABS actuator.
25		Rear right inlet solenoid valve	Replace the ABS actuator.
26		Rear right outlet solenoid valve	Replace the ABS actuator.
27		Rear left inlet solenoid valve	Replace the ABS actuator.
28		Rear left outlet solenoid valve	Replace the ABS actuator.
31		Front right speed sensor	BR-43
32		Front left speed sensor	BR-43
33		Rear right speed sensor	BR-43
34		Rear left speed sensor	BR-43
35		Front right speed sensor	BR-43
36		Front left speed sensor	BR-43
37		Rear right speed sensor	BR-43
38		Rear left speed sensor	BR-43
41		Abnormal power supply voltage (Low voltage)	BR-45
49		ABS ECU malfunctioning	Replace the ABS actuator.
51		ABS pump motor malfunctioning	Replace the ABS actuator.

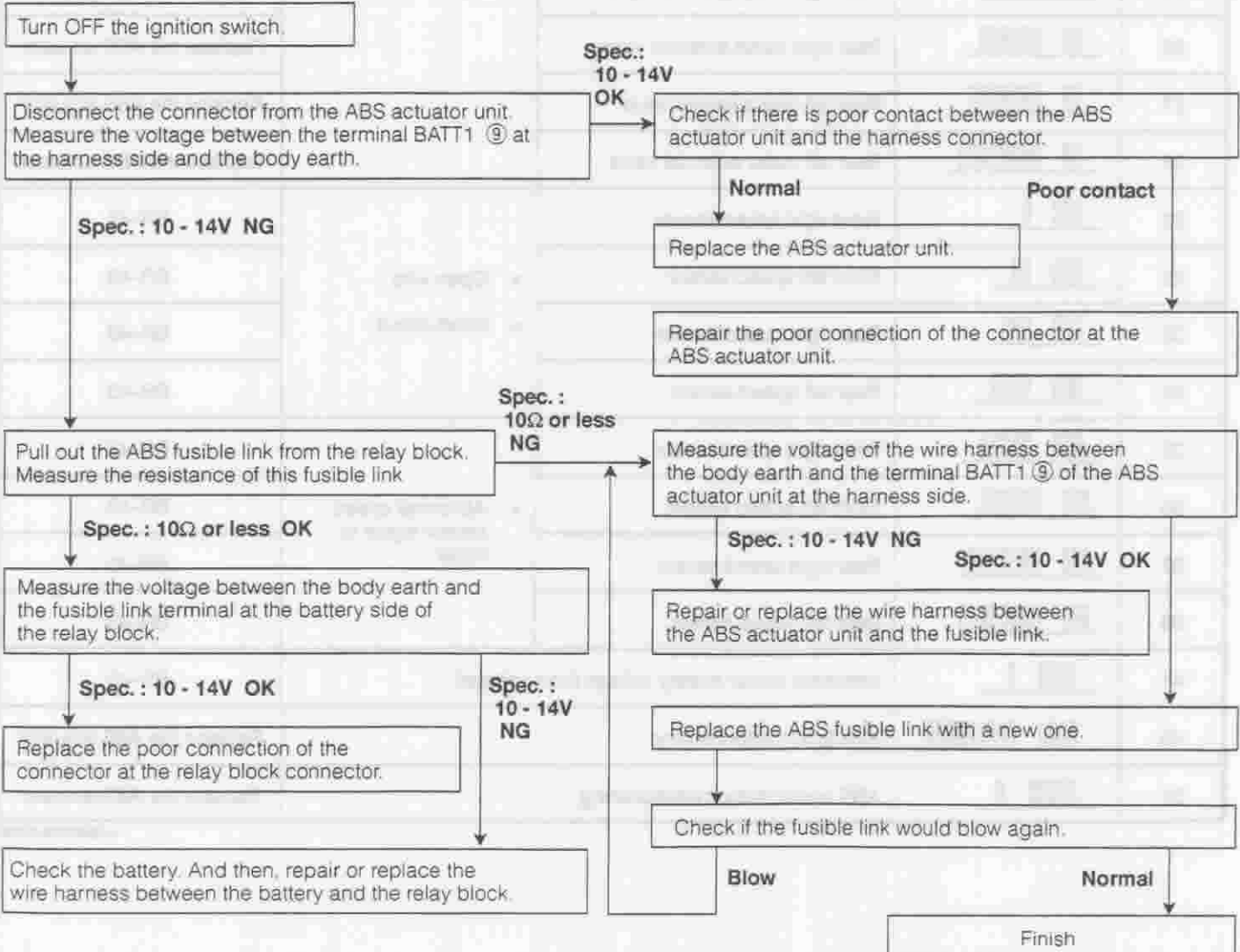
LABS00025-00000

<DIAGNOSIS CODE 11>

- Monitoring circuit voltage at time when test pulse is sent to main relay.
- Monitoring the voltage being applied to BATT1 ⑨ and BATT2 ⑫ terminal.



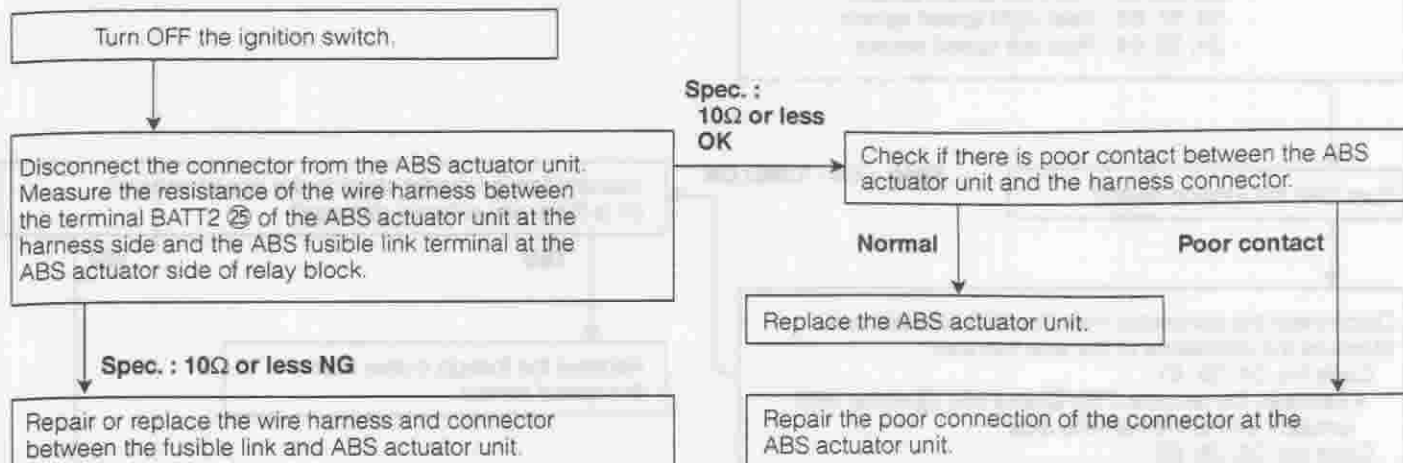
LABS00027-00023



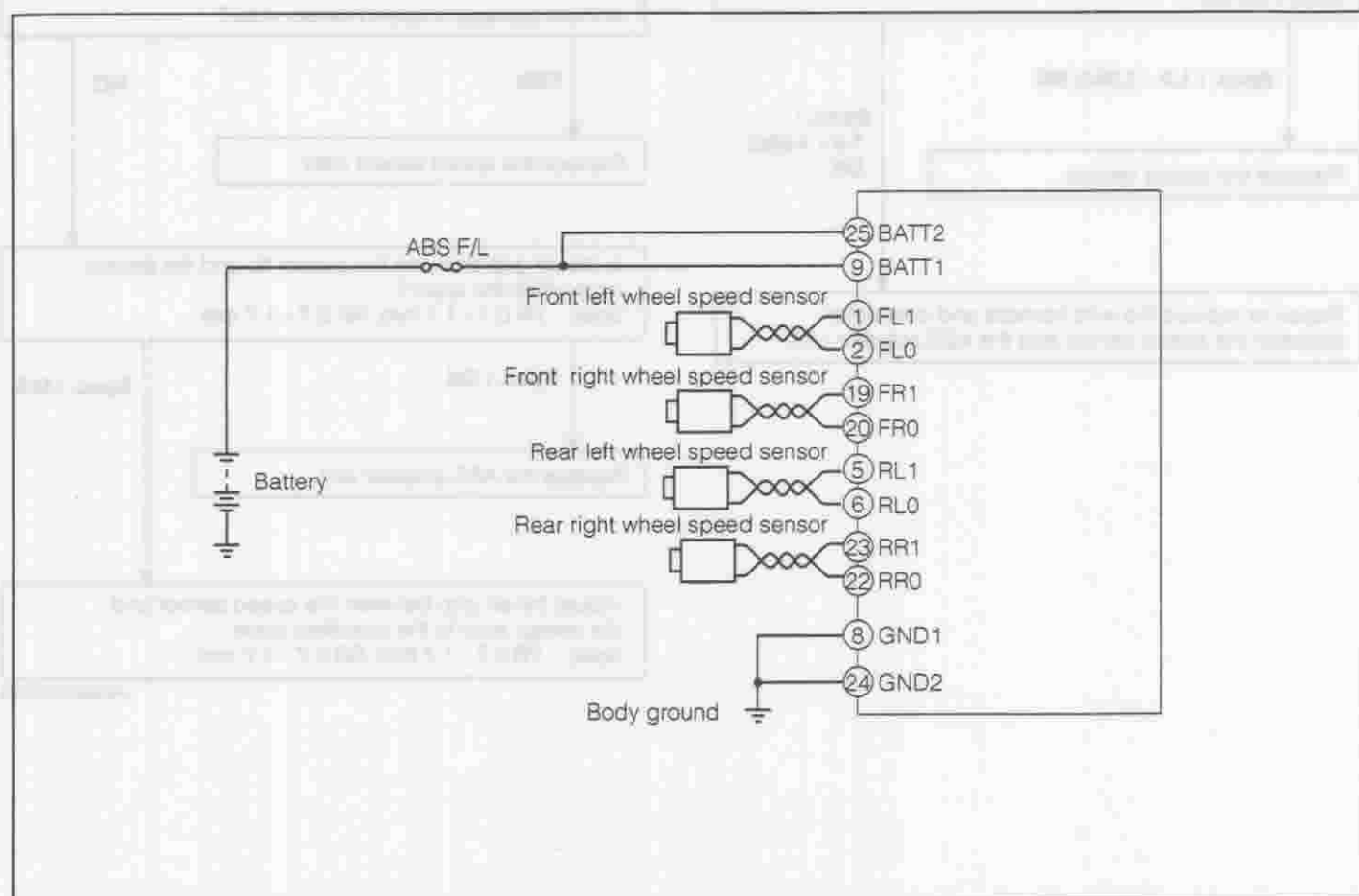
LABS00028-00000

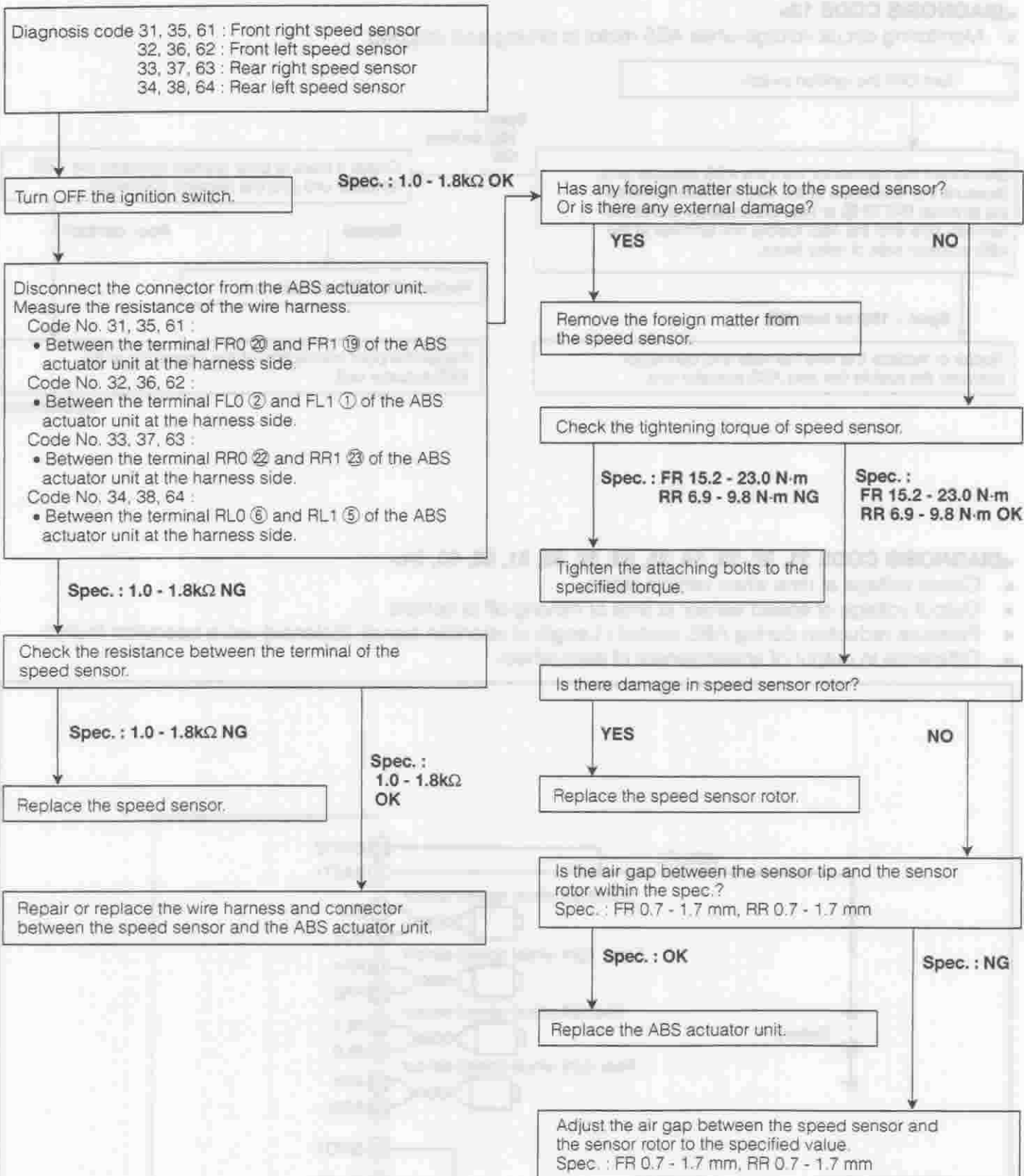
<DIAGNOSIS CODE 13>

- Monitoring circuit voltage while ABS motor is driving and stopped.

**<DIAGNOSIS CODE 31, 32, 33, 34, 35, 36, 37, 38, 61, 62, 63, 64>**

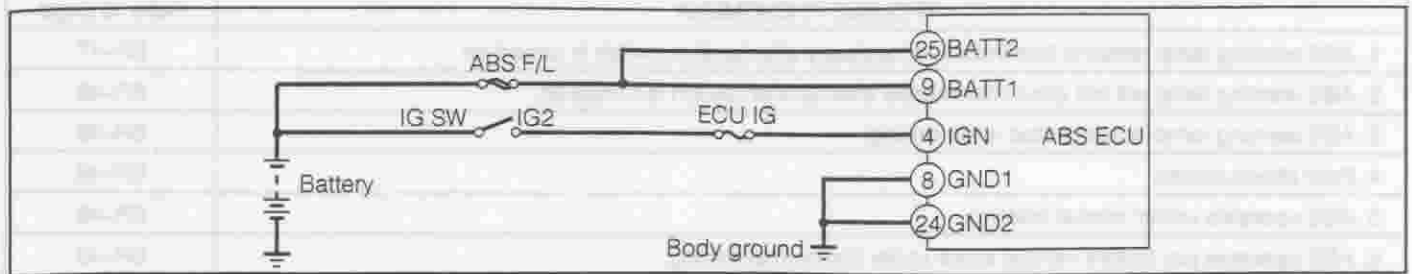
- Circuit voltage at time when vehicle stops.
- Output voltage of speed sensor at time of moving-off of vehicle.
- Pressure reduction during ABS control / Length of retention signal. (Solenoid valve operation faulty.)
- Difference in output of speed sensor of each wheel.





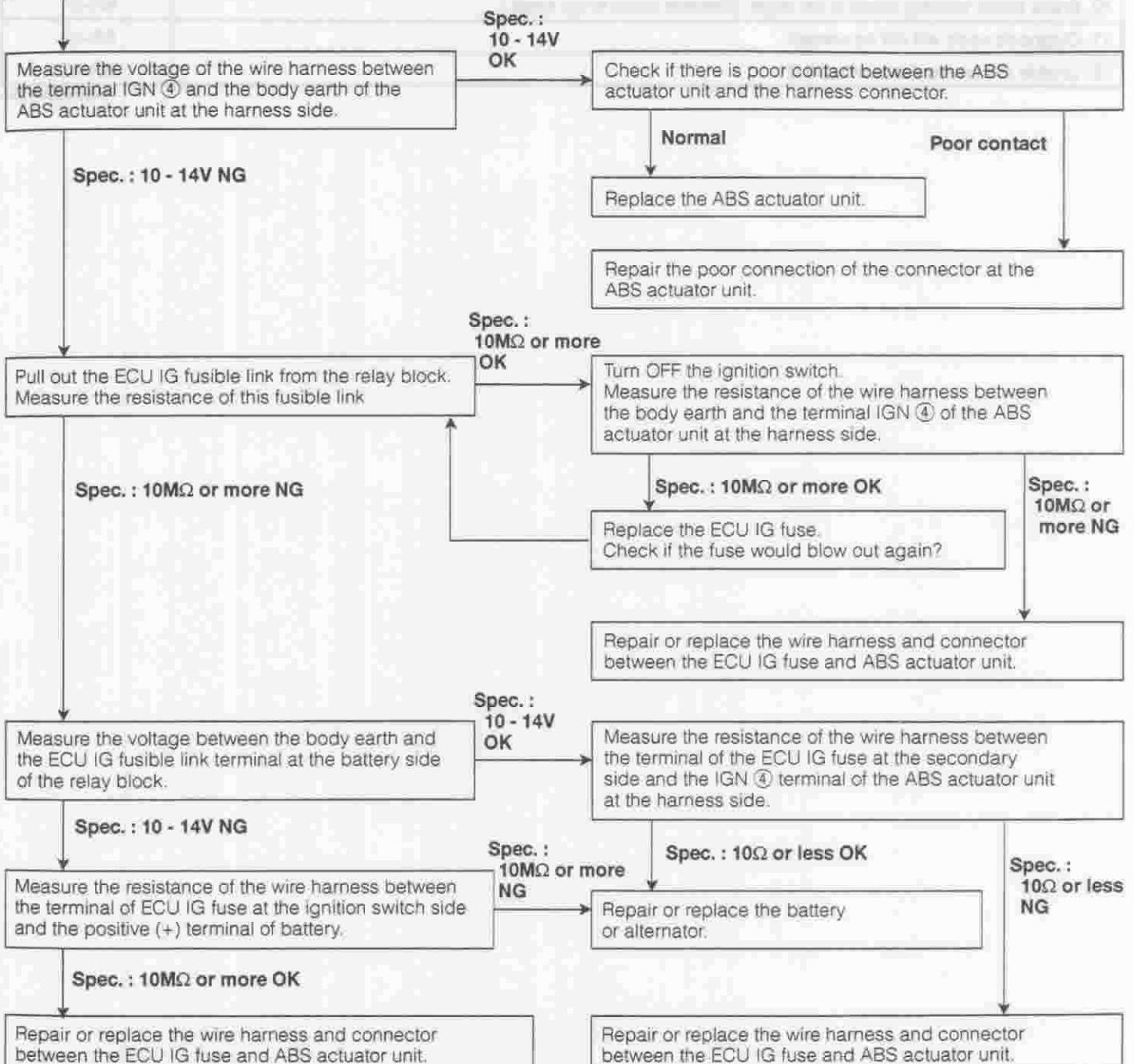
<DIAGNOSIS CODE 41>

- Monitoring input voltage of IGN ④ terminal.



LABS00032-00025

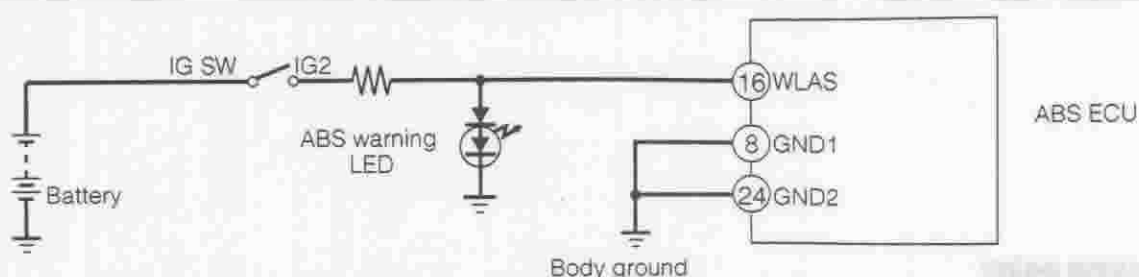
Turn OFF the ignition switch.
Disconnect the connector from the ABS actuator unit.
Turn ON the ignition switch.



LABS00033-00000

TROUBLE PHENOMENA TABLE ITEM 1

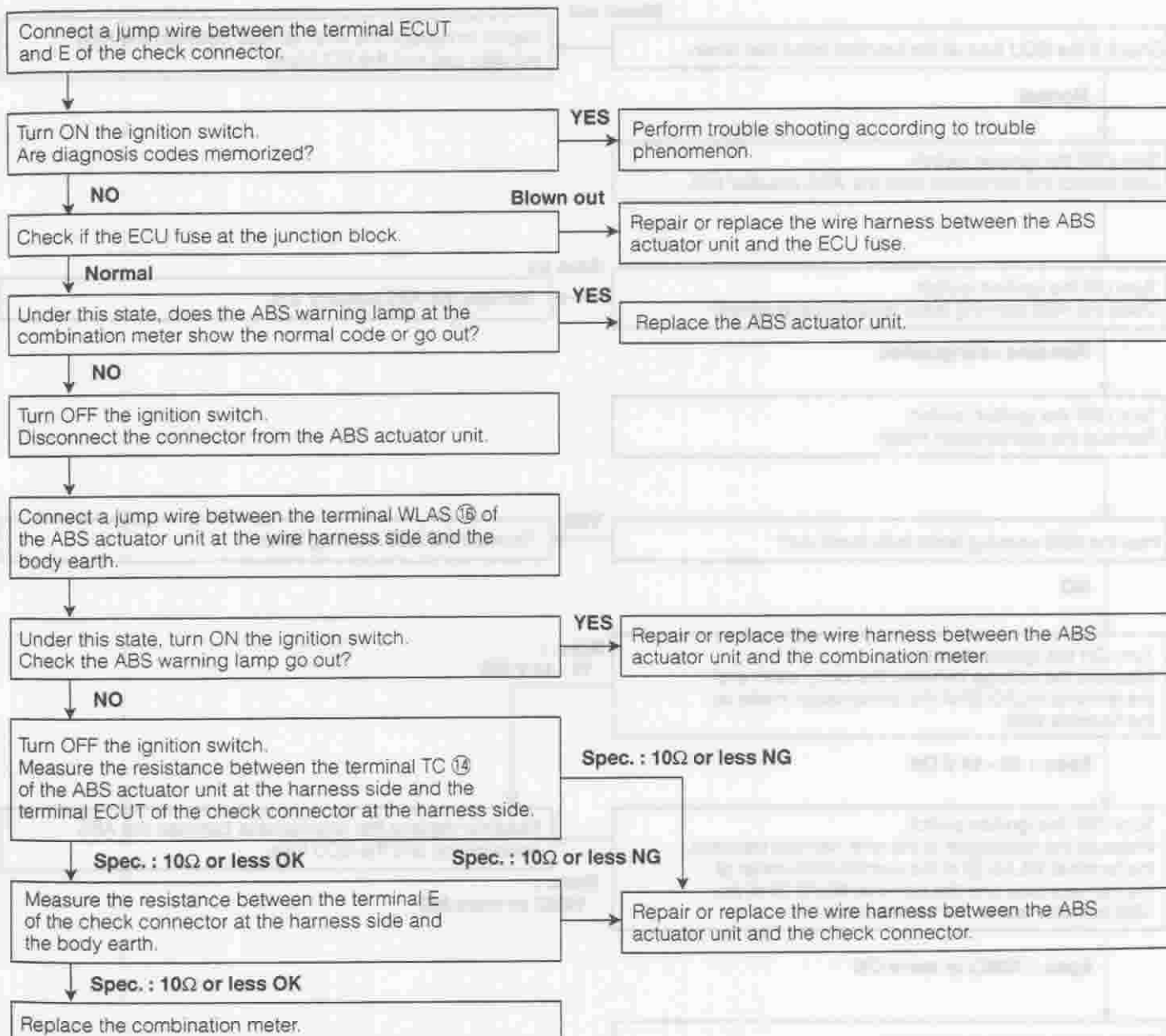
TROUBLE PHENOMENA : ABS warning lamp remains illuminated.



LABS00035-00000

Checking point:

1. Wire harness between terminal WLAS ⑯ or ABS actuator unit and combination meter (ABS warning lamp) for open circuit.
2. ABS warning lamp circuit in the combination lamp
3. ABS actuator unit



LABS00036-00000

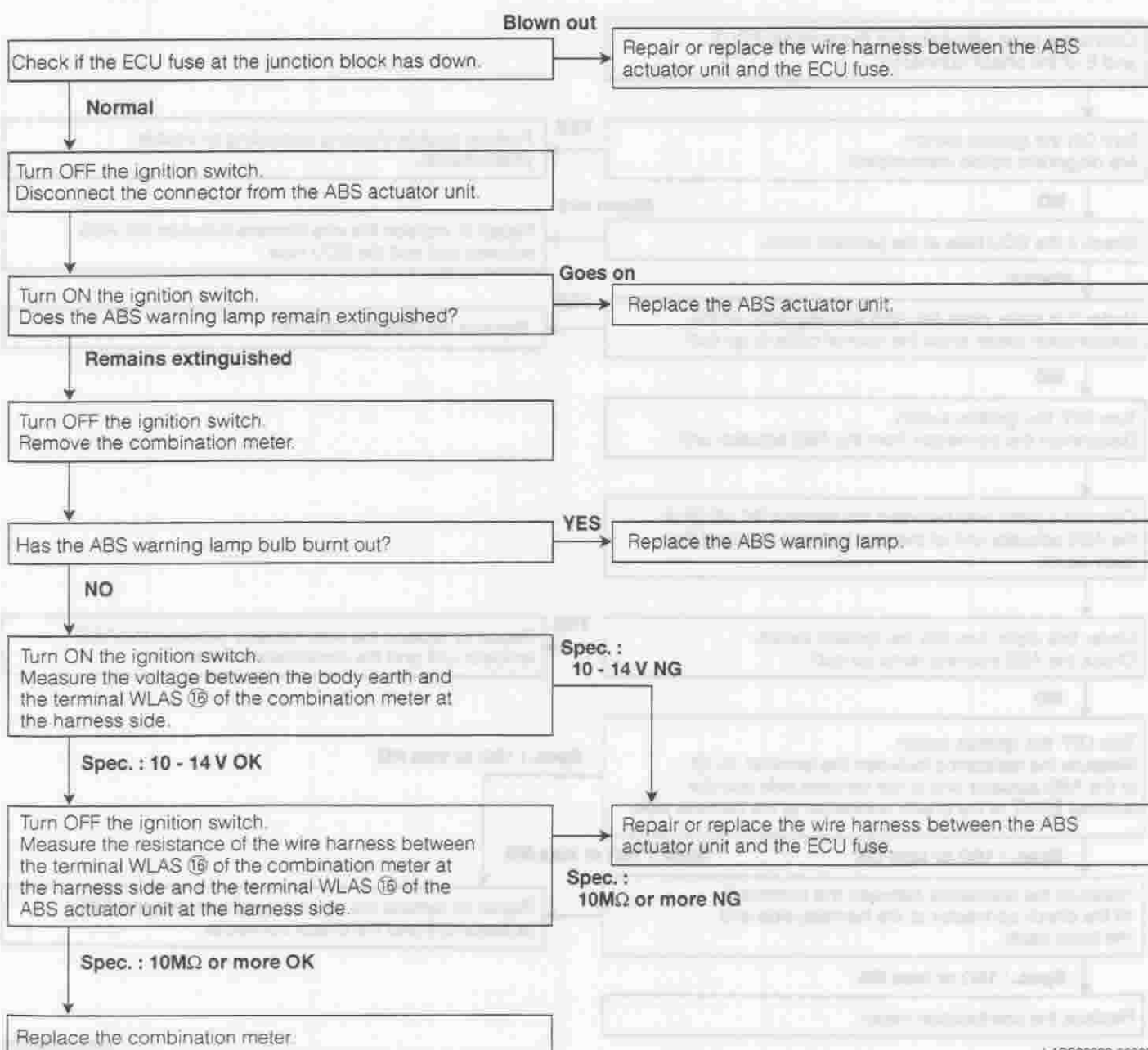
TROUBLE PHENOMENA TABLE ITEM 2

TROUBLE PHENOMENA : ABS warning lamp will not glow after ignition switch is turned on.

LABS00037-00000

Checking point:

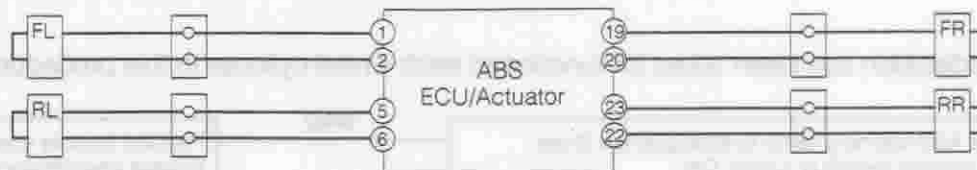
1. ABS warning lamp for burnout.
2. Circuit between battery and combination meter for short circuit or open wire.
3. Circuit between WLAS ⑩ terminal or ABS actuator and combination meter for short circuit with positive circuit.
4. ABS warning lamp circuit in the combination meter.
5. ABS actuator unit



TROUBLE PHENOMENA TABLE ITEM 3, 4, 5, 6, 7, 8

TROUBLE PHENOMENA :

- ABS warning lamp is illuminated while driving
- Poor effectiveness
- ABS operates under normal braking
- ABS operates just before vehicle stops under the normal driving.
- Brake pedal vibrates excessively.
- Wheel locks frequently during ABS operation.



LABS00039-00000

Checking point:

1. Wheel speed sensor and related wire harness.
2. ABS actuator unit

Connect a jump wire between the terminal ECUT and E of the check connector.

Turn ON the ignition switch.
Are diagnosis codes memorized?

YES

Perform trouble shooting according to trouble phenomenon.

NO

Turn OFF the ignition switch.
Is there damage in each speed sensor?

YES

Replace the speed sensor.

NO

Has any foreign matter stuck to the speed sensor?
Or is there any external damage?

YES

Remove the foreign matter from the speed sensor.

NO

Check the tightening torque of speed sensor.
Spec. : FR 15.2 - 23 N·m, RR 6.9 - 9.8 N·m

Spec. : OK

Tighten the attaching bolts to the specified torque.

Spec. : NG

Is there damage in speed sensor rotor?

YES

Replace the speed sensor rotor.

NO

Spec. : OK

Is the air gap between the sensor tip and the sensor rotor within the spec?
Spec. : FR 0.7 - 1.7 mm, RR 0.7 - 1.7 mm

Adjust the air gap between the speed sensor and the sensor rotor to the specified value.
Spec. : 0.7 - 1.7 mm

Spec. : NG

Disconnect the connector from the ABS actuator unit.
Measure the resistance between each terminal of the ABS actuator unit at the harness side and the each speed sensor at the harness side.

Spec. :
10Ω or less NG

Spec. : 10Ω or less OK

Measure the resistance, while moving the wire harness between the actuator unit and the each speed sensor by hand.

Repair or replace the wire harness between the ABS actuator unit and the each speed sensor.

Spec. : 1.0 - 1.8kΩ OK

Spec. :
1.0 - 1.8kΩ NG

Replace the ABS actuator unit.

LABS00040-00000

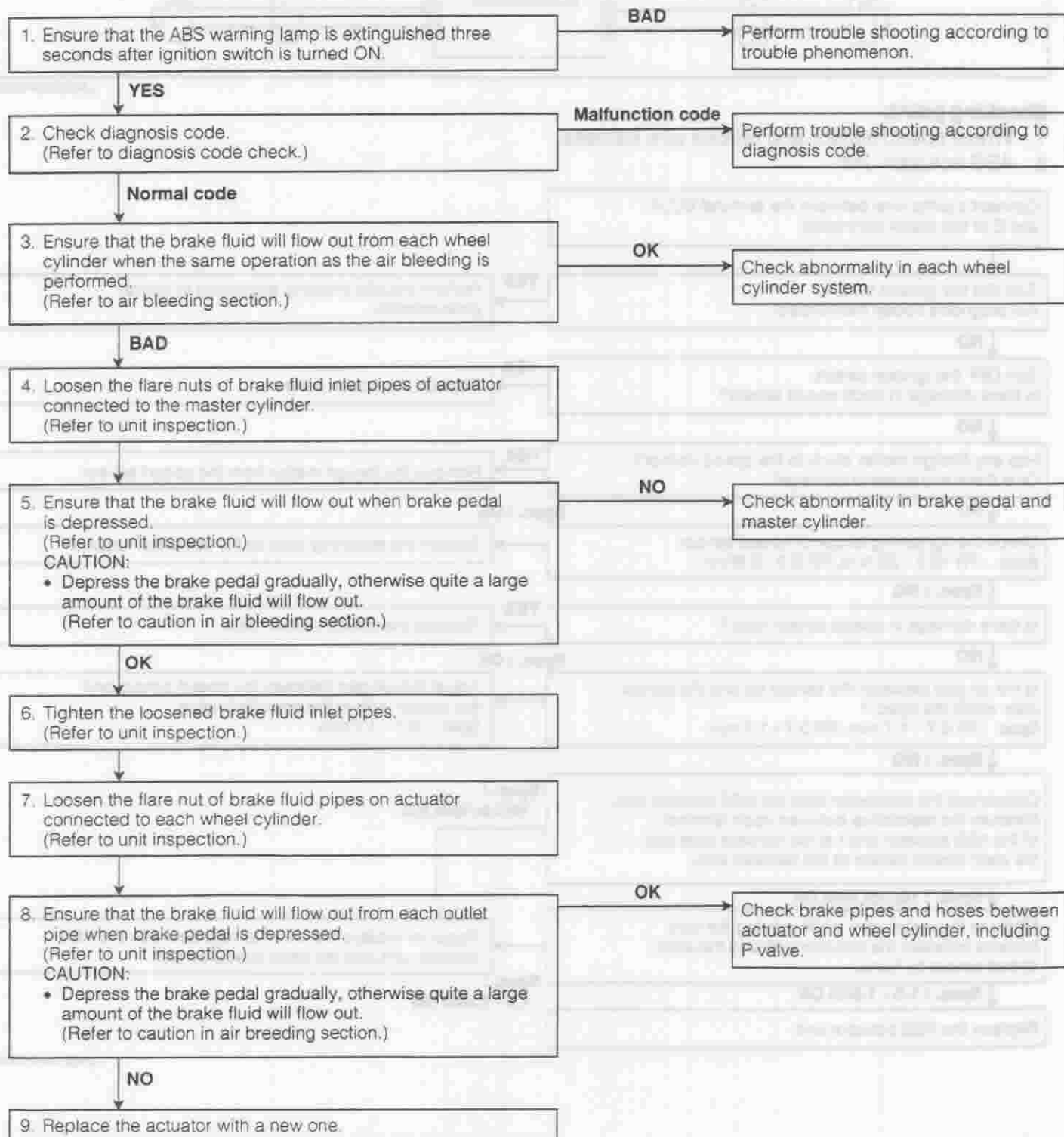
TROUBLE PHENOMENA TABLE ITEM 9

TRUBLE PHENOMENA : Brake pedal working travel is too small.

LAB500041-00000

NOTE:

- No consideration has been taken for function of each wheel cylinder in this procedure.

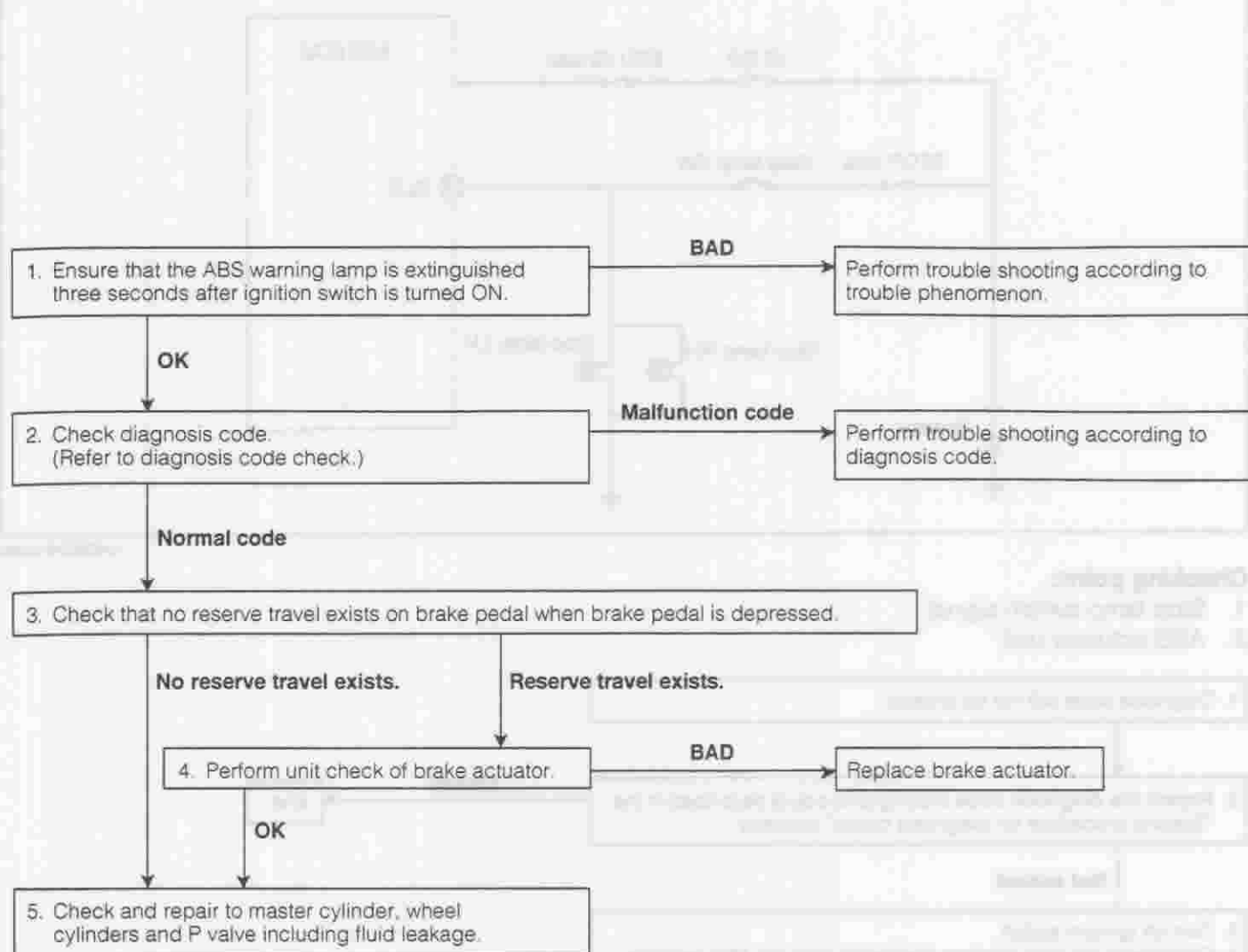


LAB500042-00000

TROUBLE PHENOMENA TABLE ITEM 10

TROUBLE PHENOMENA : Brake pedal working travel is too large. (Reserve travel is too small.)

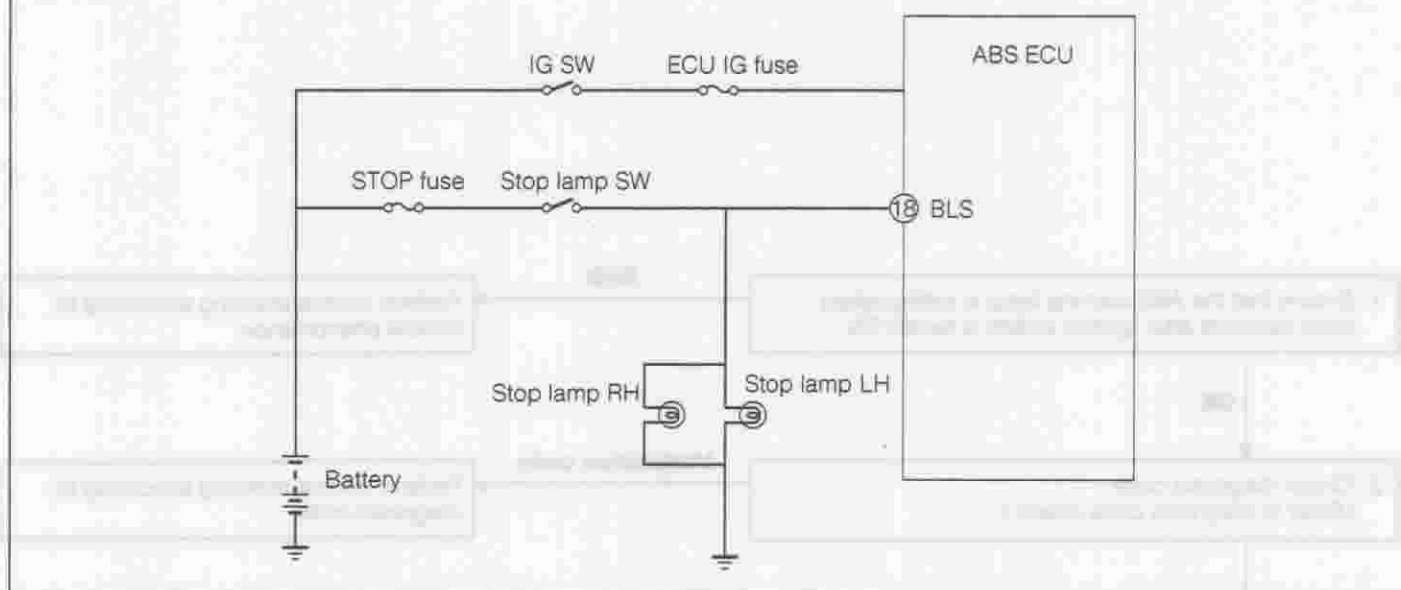
LABS00043-00000



LABS00044-00000

TROUBLE PHENOMENA TABLE ITEM 11

TROUBLE PHENOMENA : Diagnosis code will not be erased.



LABS00046-00000

Checking point:

1. Stop lamp switch signal
2. ABS actuator unit

1. Diagnosis code will not be erased.

2. Repeat the diagnosis code erasing procedure described in the "Erasing procedure for diagnosis codes" properly.

Erased

End.

Not erased

3. Turn off ignition switch.
4. Disconnect the wire harness connector from the ABS actuator unit

5. Ensure that approximate battery voltage will be applied to the BLS ⑱ terminal of ABS actuator unit connector of the wire harness when brake pedal is depressed.

NO

Ensure that continuity exists between stop lamp switch and BLS ⑱ terminal of the ABS actuator unit.

YES

Check fuse, stop lamp switch and related harness for open wire. Repair, as required.

NO

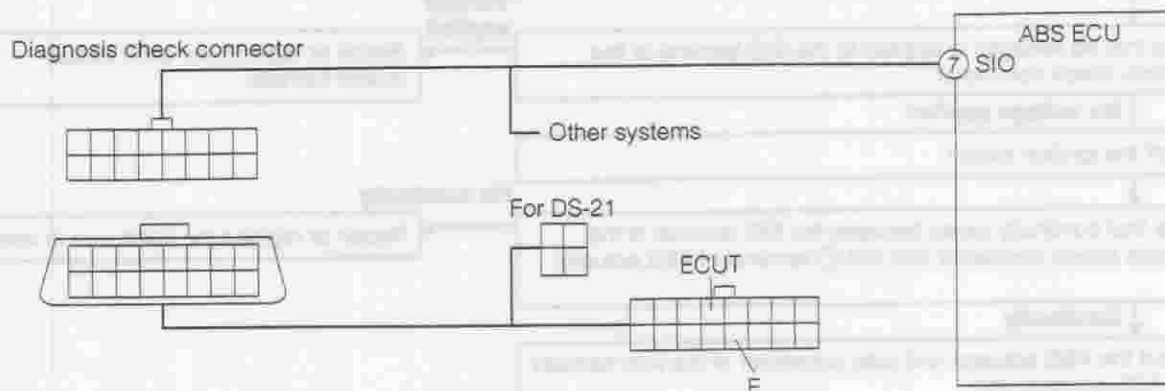
Repair wire harness.

6. Check ABS actuator unit.
(Refer to unit inspection of ABS actuator unit.)

LABS00046-00000

TROUBLE PHENOMENA TABLE ITEM 12

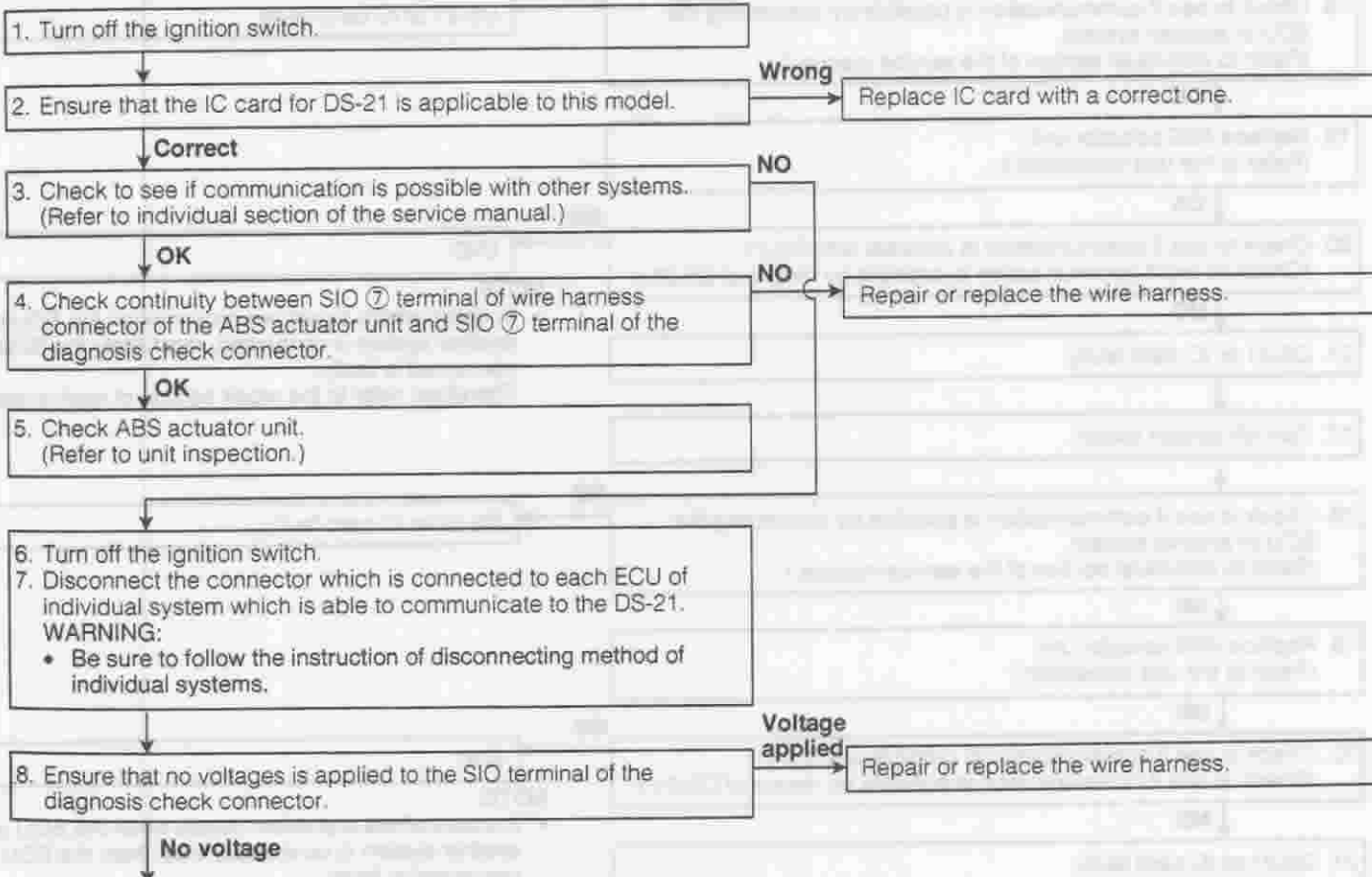
TROUBLE PHENOMENA: Unable to communicate with DS-21

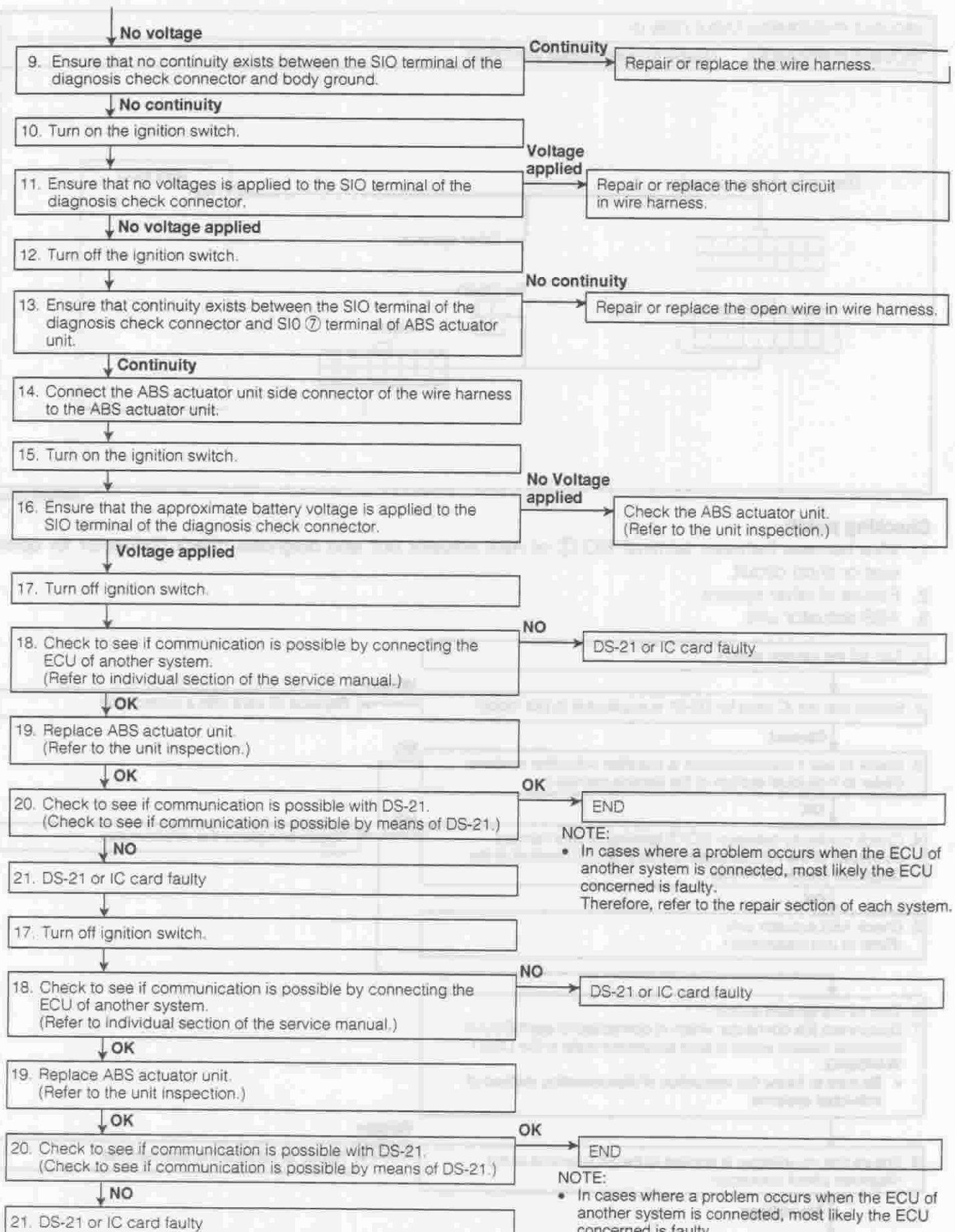


LABS00047-00000

Checking point:

1. Wire harness between terminal SIO ⑦ of ABS actuator unit and diagnosis check connector for open wire or short circuit.
2. Failure of other system.
3. ABS actuator unit.





NOTE:

- In cases where a problem occurs when the ECU of another system is connected, most likely the ECU concerned is faulty. Therefore, refer to the repair section of each system.

NOTE:

- In cases where a problem occurs when the ECU of another system is connected, most likely the ECU concerned is faulty. Therefore, refer to the repair section of each system

Erasing procedure for diagnosis codes

NOTE:

- The diagnosis codes will not be erased even if the battery power supply is shut off.

1. Erasing procedure by brake pedal

- (1) Connect the following SST to the diagnosis connector.

SST: 09991-87404-000

- (2) Connect the ECUT and E terminals in the SST terminal with the following SST.

SST: 09991-87403-000

CAUTION:

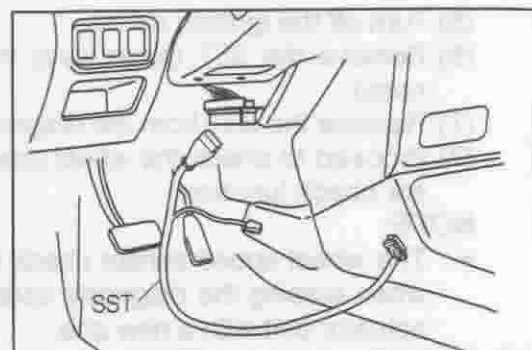
- Never connect the terminals other than those specified, for even slight contact of other terminals may lead to serious malfunction or damage.

- (3) Turn ON the ignition switch. (Never start the engine.)

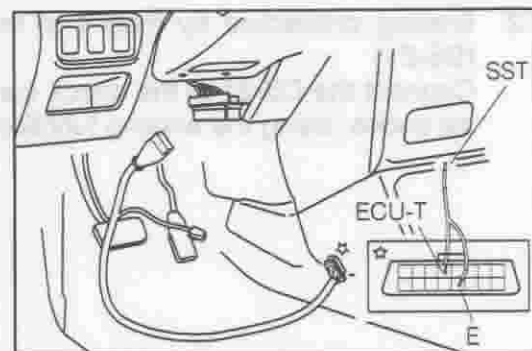
- (4) Depress the brake pedal more than 8 times within five seconds in order to repeat the ON/OFF operation of the stop lamp switch immediately after the ignition switch is turned ON.

NOTE:

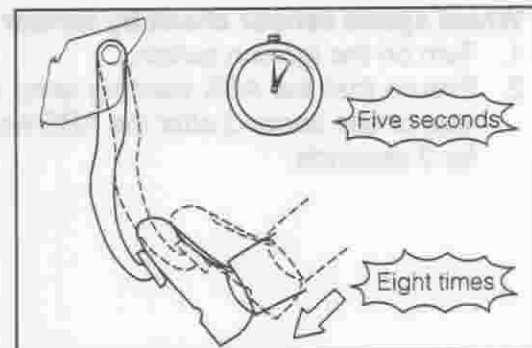
- When no change in ON/OFF state of the stop lamp switch is inputted within three seconds after the ignition switch has been turned ON, or when no change in ON/OFF state of the stop lamp of the second time onward is inputted within one second, the diagnosis code remains indicated and no diagnosis code will be erased.
- If any malfunction persists even after the diagnosis code has been erased, the warning lamp will not go out.
- After the diagnosis code is erased, the mode will automatically move on to the sensor check mode. (Refer to the section under "Wheel speed sensor check by sensor check function.")



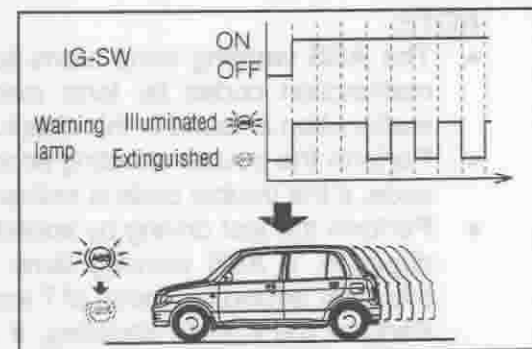
LABS00049-00026



LABS00050-00027



LABS00051-00028



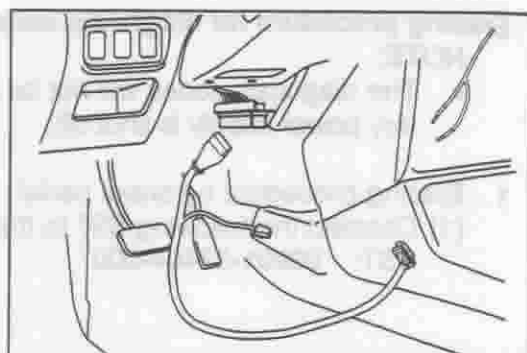
LABS00052-00000

LABS00000-00029

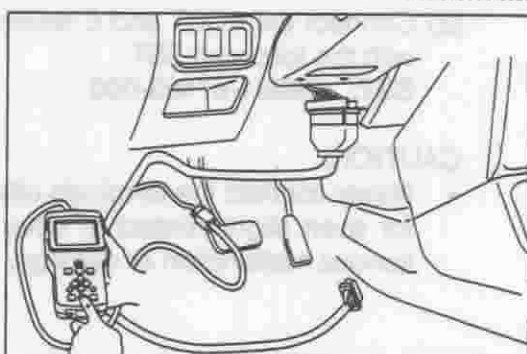
- (5) Turn off the Ignition switch.
- (6) Remove the SST (jump wire) from the SST (sub harness).
- (7) Remove the SST from the diagnosis connector.
- (8) Proceed to check the wheel speed sensor by the sensor check function.

NOTE:

- The wheel speed sensor check function will take place when erasing the diagnosis code or replacing the ABS actuator unit with a new one.



LABS00053-0030



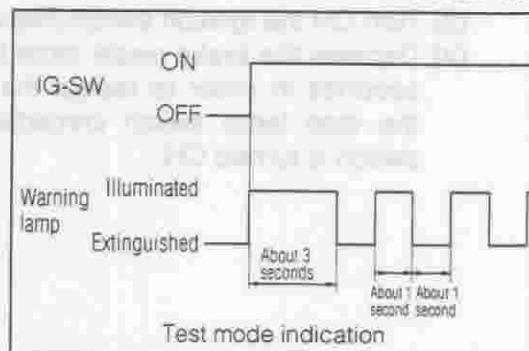
LABS00054-0031

2. Erasing procedure by means of trouble shooting device (DS-21)

Connect the DS-21 to the check connector. Erase diagnosis codes, using the erasing function.

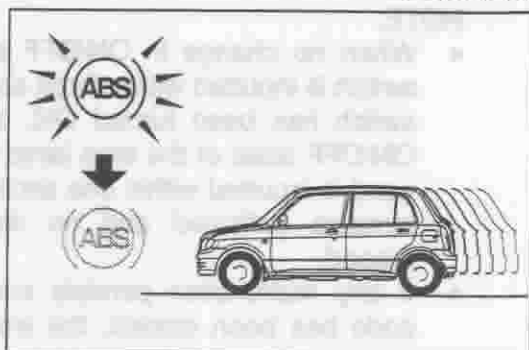
Wheel speed sensor check by sensor check function

1. Turn on the ignition switch.
2. Ensure that the ABS warning lamp starts to blink at intervals of one second after the ABS warning lamp illuminates for 3 seconds.



LABS00055-0032

3. Perform the test driving at speed of more than 7 km/h.
4. Ensure that the ABS warning lamp is turned off.



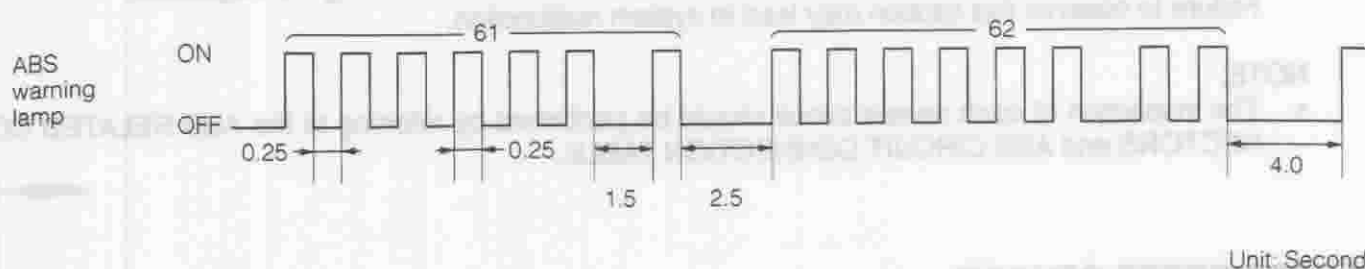
LABS00056-0033

NOTE:

- The ABS warning lamp starts to blink to indicate the malfunction codes by form mentioned below, if any malfunction is found in this check.
- Perform the trouble shooting according to the diagnosis code, if the trouble code is indicates.
- Perform the test driving by speed of 10 km/h in straight direction, if ABS warning lamp is remain illuminated after test driving by speed of 7 km/h. Perform the trouble shooting, if ABS warning lamp is remain illuminated.

LABS00057-00000

<Example of blinking form of the ABS warning lamp>



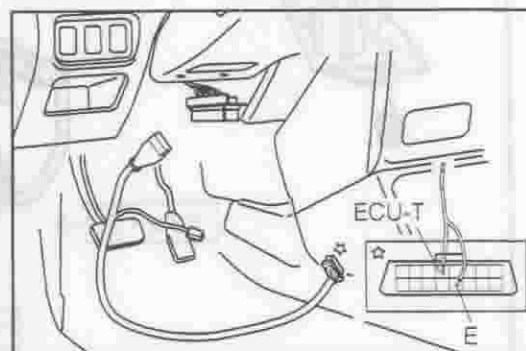
Diagnosis item	Front right speed sensor	Front left speed sensor	Rear right speed sensor	Rear left speed sensor
Diagnosis code	61	62	63	64
Refer to page	BR-43	BR-43	BR-43	BR-43

LABS00058-00000

5. Turn off the ignition switch.
6. Connect the following SST to the diagnosis connector.
SST: 09991-87404-000

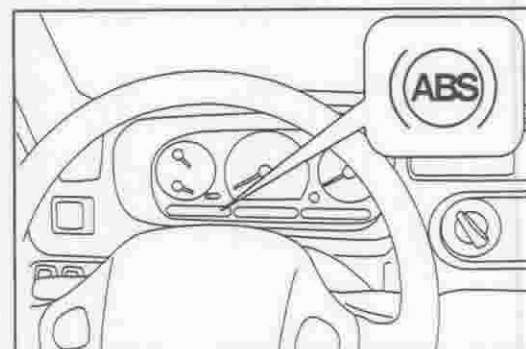
Connect the ECU and GND terminals in the SST with the following SST:

SST: 09991-87403-000



LABS00059-00004

7. Turn on the ignition switch.
8. Read out the diagnosis codes by observing the number of blinking of the ABS warning lamp.



LABS00060-00035



UNIT INSPECTION & REPLACEMENT

CAUTION:

- Be very careful not to deform the terminal in the related connector during the inspection. Failure to observe this caution may lead to system malfunction.

NOTE:

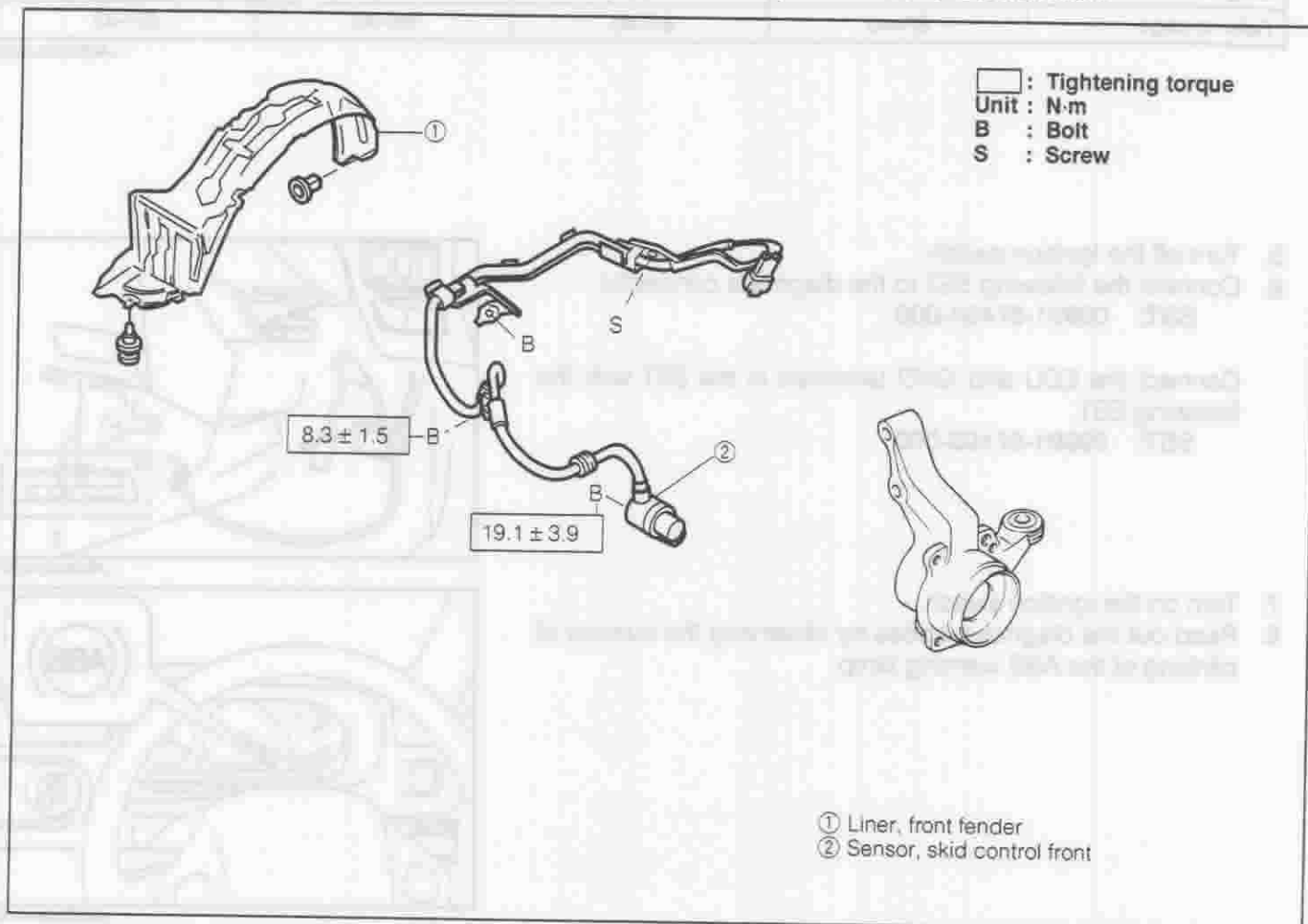
- The inspection of each sensor circuit should be performed by referring to the ABS RELATED CONNECTORS and ABS CIRCUIT CONNECTION TABLE.

LABS00061-00000

FRONT SPEED SENSOR

NOTE:

- The check of the speed sensor is basically carried out by the sensor check function.



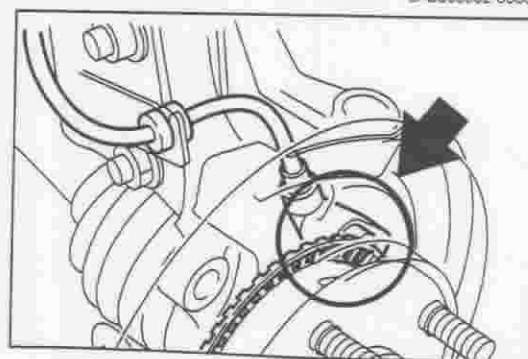
LABS00062-00036

1. Checking of air gap

Ensure that the air gap between the sensor tip and the sensor rotor is within the specified value.

Air Gap: 1.2 ± 0.5 mm

If the air gap fails to meet the specified air gap, adjust the clearance by adjusting the sensor attaching condition or replace the speed sensor, knuckle or sensor rotor (drive shaft), as required. (Refer to FS section.)



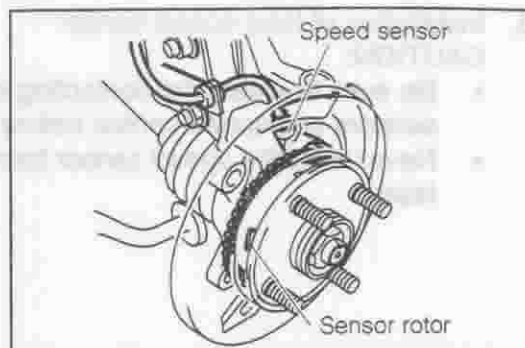
LABS00063-00037

2. Checking of sensor rotor

Inspect the sensor rotor for the following points.

- Ensure that the sensor rotor is pressed in to the hub properly, is free from damage and is not contaminated by foreign materials.
- Ensure that the wheel bearing has no excessive play.

If any trouble exists, clean, repair or replace the sensor rotor (drive shaft) or wheel bearing, as required. (Refer to FS section.)



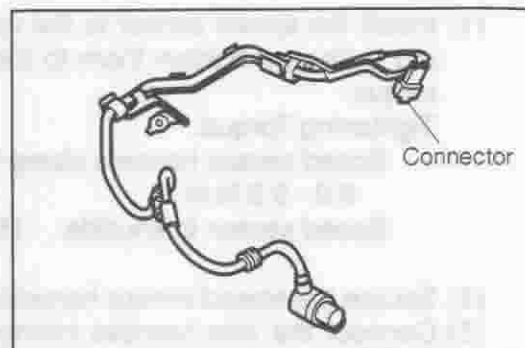
LABS00064-00036

3. Inspection of speed sensor

- (1) Ensure that the front speed sensor resistance is within the specified value, using an ohmmeter.

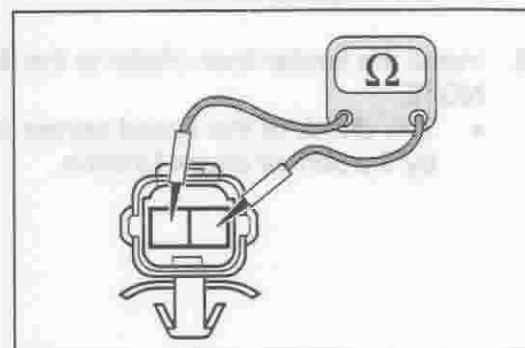
Specified Resistance: $1.4 \pm 0.4 \text{ k}\Omega$ (at 20°C)

If the measured resistance fails to meet the specified value above, replace the speed sensor with a new one.



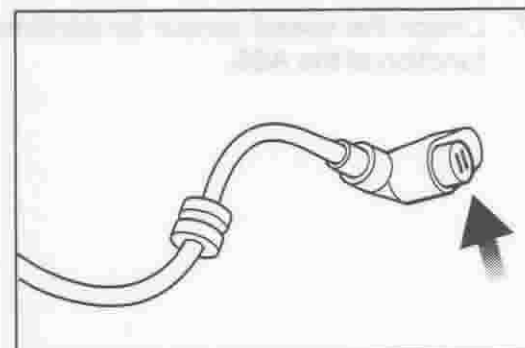
LABS00065-00039

If the measured resistance fails to meet the specified value above, replace the speed sensor with a new one.



LABS00066-00040

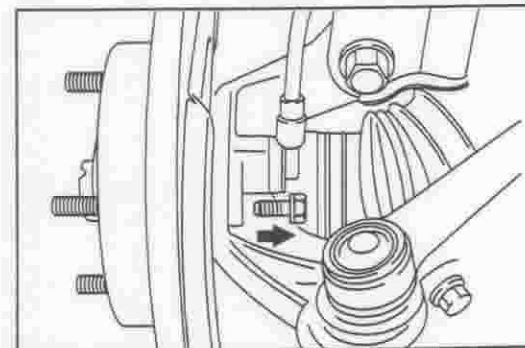
- (2) Ensure that the tips of the speed sensors are free from damage or contamination with foreign materials. Clean the tips of the speed sensors, if they are contaminated.



LABS00067-00041

4. Removal of front speed sensor

- (1) Remove the fender liner. (Refer to the BO section.)
- (2) Disconnect the wire harness side connector from the sensor connector.
- (3) Remove the wire clamps of the front speed sensor.
- (4) Remove the front speed sensor by removing the attaching bolts.

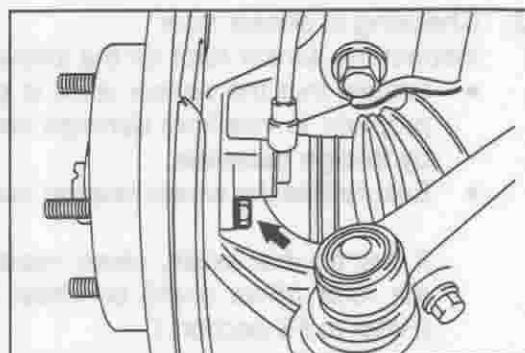


LABS00068-00042

5. Installation of front speed sensor

CAUTION:

- Be sure to clean the contacting surfaces of the speed sensors and speed sensor before the installation.
- Never twist the speed sensor harness during the installation.



LABS00069-00043

- (1) Install the speed sensor to the vehicle with the attaching bolts and tighten them to the specified tightening torque.

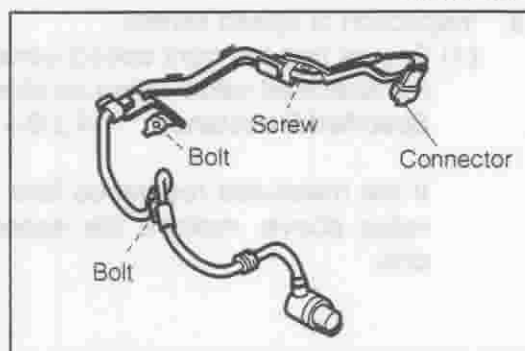
Tightening Torque:

Speed sensor harness clamp to inner fender:

6.9 - 9.8 N·m

Speed sensor to knuckle: 15.2 - 23.0 N·m

- (2) Secure the speed sensor harness by harness clamps.
- (3) Connect the wire harness connector to the connector of the speed sensor.

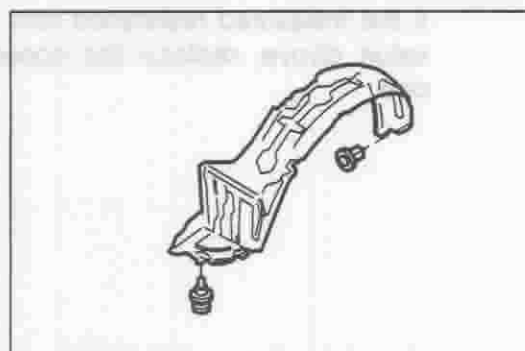


LABS00070-00044

6. Install the fender liner. (Refer to the BO section.)

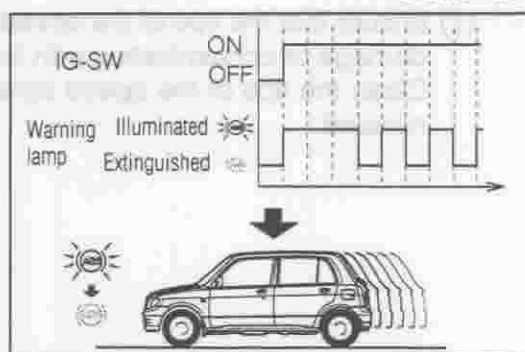
NOTE:

- The check of the speed sensor is basically carried out by the sensor check function.



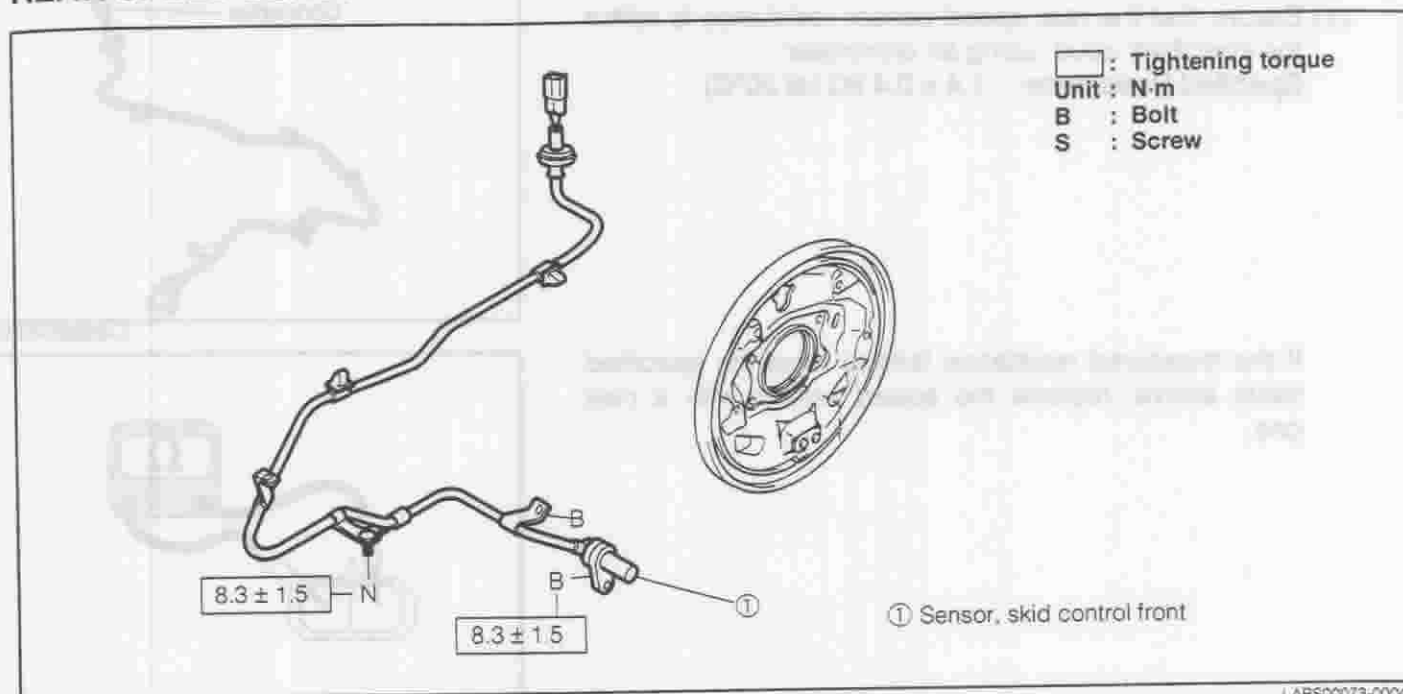
LABS00071-00045

7. Check the speed sensor by performing the sensor check function of the ABS.



LABS00072-00046

REAR SPEED SENSOR

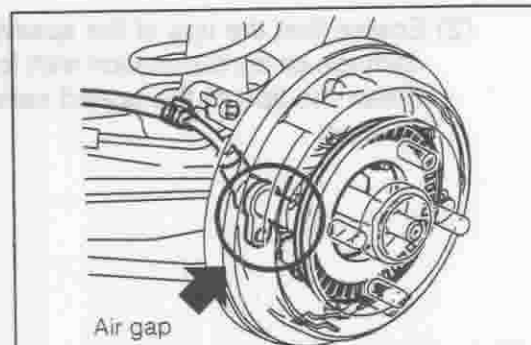


1. Checking of air gap.

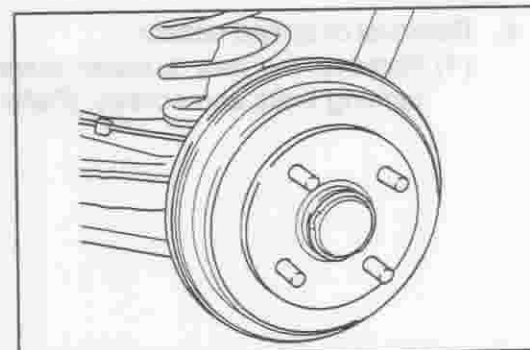
- (1) Remove the rear wheel and brake drum. (Refer to the rear brake section.)
- (2) Ensure that the air gap between the sensor tip and the sensor rotor is within the specified value.

Air Gap: 1.2 ± 0.5 mm

If the air gap fails to meet the specified air gap, adjust the air gap by adjusting the attaching condition of the speed sensor or replace the speed sensor, brake backing plate (refer to the BR section.) or sensor rotor, as required.



- (3) Install the rear wheel and brake drum.

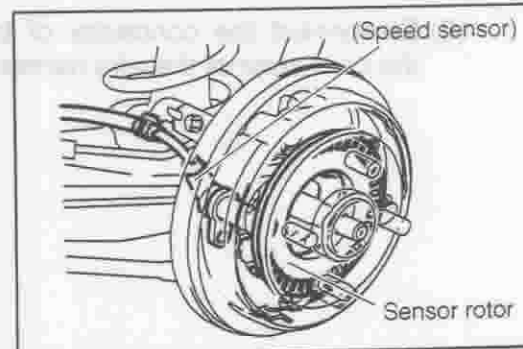


2. Checking of sensor rotor.

- (1) Remove the rear wheel and brake drum. (Refer to the rear brake section.)
- (2) Ensure that the sensor rotor is free from damage and contamination with foreign materials. Also, check that no excessive free play exists on the wheel bearings. (Refer to the RS section)

If any trouble exists, clean, repair or replace the sensor rotor or wheel bearing, as required.

- (3) Install the rear wheel and brake drum. (Refer to rear brake section.)

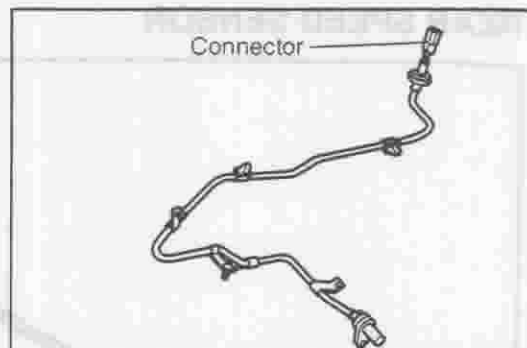


3. Inspection of speed sensor

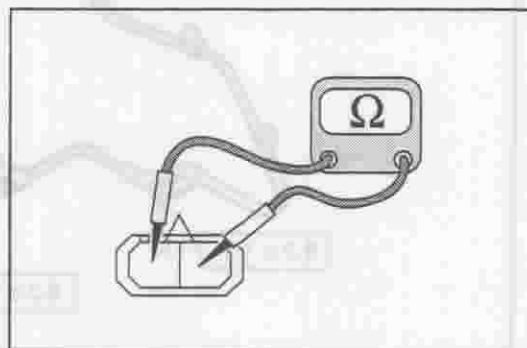
- (1) Ensure that the rear speed sensor resistance is within the specified value, using an ohmmeter.

Specified Resistance: $1.4 \pm 0.4 \text{ k}\Omega$ (at 20°C)

If the measured resistance fails to meet the specified value above, replace the speed sensor with a new one.

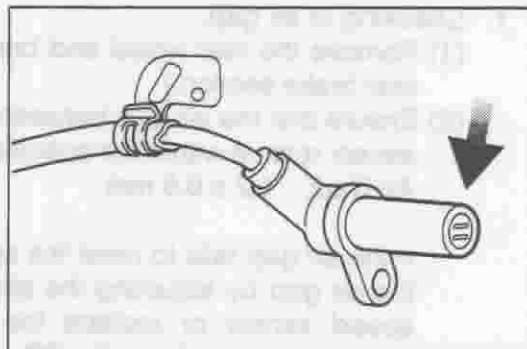


LABS00077-00051



LABS00078-00052

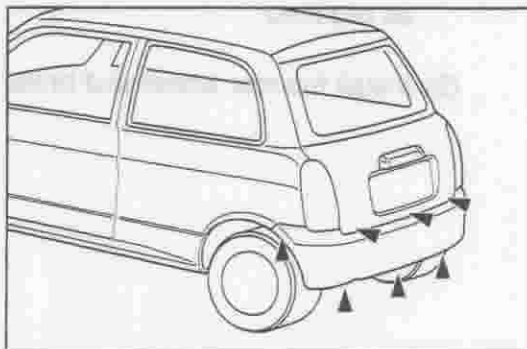
- (2) Ensure that the tips of the speed sensors are free from damage or contamination with foreign materials. Clean the tips of the speed sensors, if they are contaminated.



LABS00079-00053

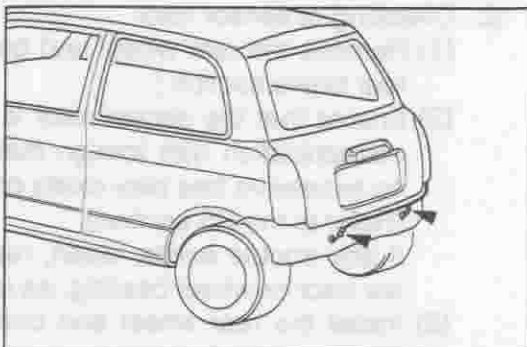
4. Removal of speed sensor

- (1) Remove the rear bumper cover by removing the attaching bolts and screws. (Refer to the BO section.)



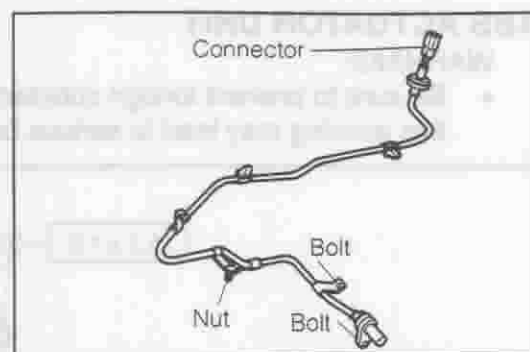
LABS00080-00054

- (2) Disconnect the connector of the speed sensor from the connector of the wire harness.



LABS00081-00055

- (3) Remove the speed sensor by removing the attaching bolts and nuts.



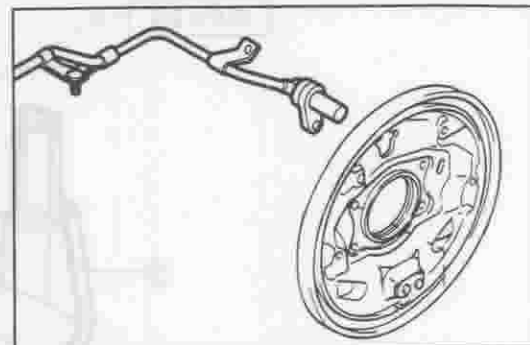
LABS00062-00056

5. Installation of speed sensor

- (1) Clean the attaching surface of the speed sensor and backing plate.
- (2) Install the speed sensor with the attaching bolt and tightening it to the specified tightening torque.
Tightening Torque: 6.9 - 9.8 N·m

CAUTION:

- After the installation, be sure to check that the clearance between the speed sensor and the speed sensor rotor is within the specified value.

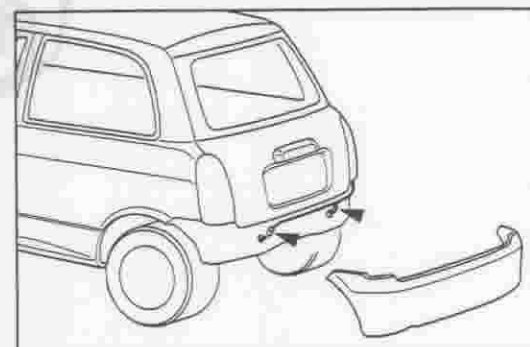


LABS00083-00057

- (3) Connect the sensor harness and install them with attaching bolts and then, ensure that they are installed properly.

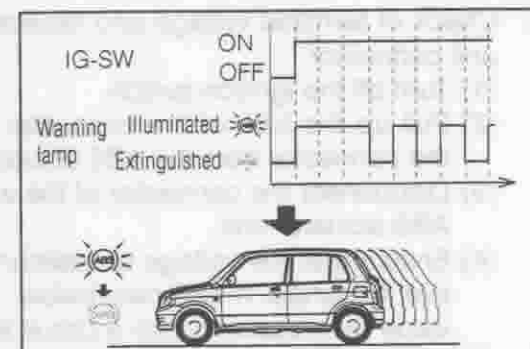
Tightening Torque: 6.9 - 9.8 N·m

- (4) Connect the connector of the speed sensor to the connector of the wire harness.
- (5) Install the rear bumper cover by installing the attaching bolts and screws. (Refer to the BO section.)



LABS00084-00058

- (6) Check the speed sensor by performing the sensor check function of the ABS.

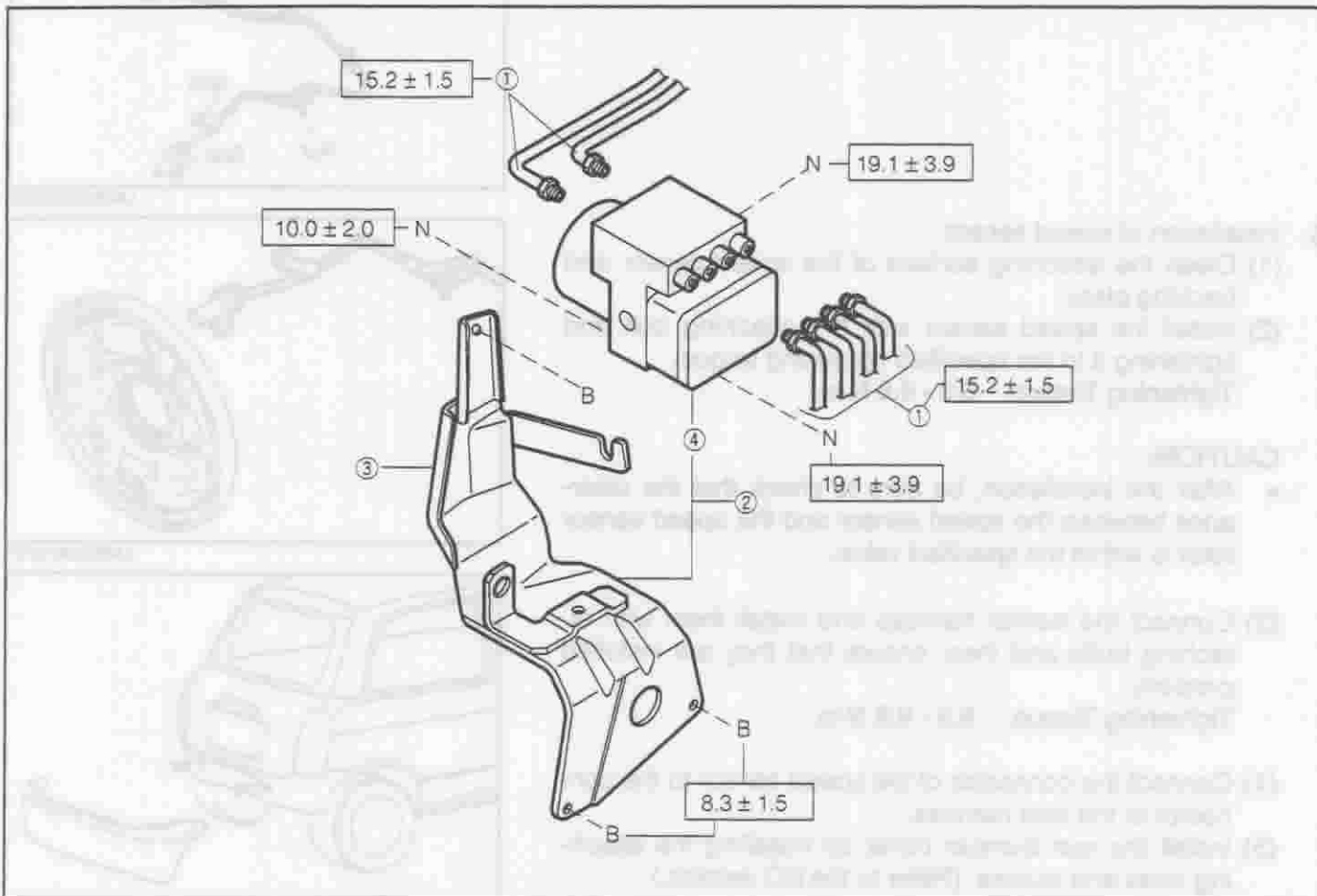


LABS00085-00059

ABS ACTUATOR UNIT

WARNING:

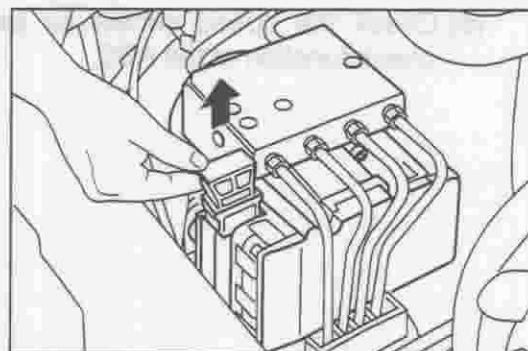
- Be sure to prevent foreign substances from being admitted into the brake actuator. Failure to observe this warning may lead to serious brake malfunction.



LABS00086-00060

- Check of terminal voltage and resistance of ABS actuator unit connector.

- Turn off the ignition switch.
- Pull up the lock of the connector lock lever to unlock the connector from the ABS actuator unit.
- Disconnect the connector of the wire harness from the ABS actuator unit.
- Ensure that the voltage or resistance between respective terminals mentioned below within the specified value by measuring with a circuit tester.



LABS00087-00061

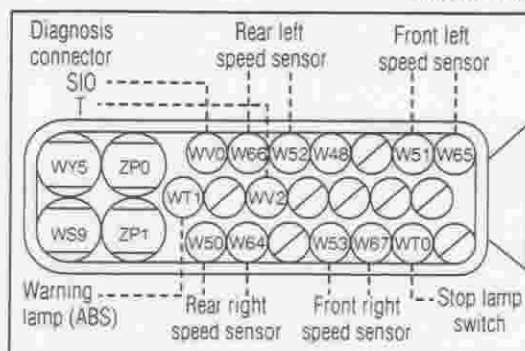
CAUTION:

- Be very careful not to connect the tester probe to terminals other than those specified.

NOTE:

- Refer to page BR-34 under "ABS-RELATED CONNECTORS."

- Connect the connector of the wire harness to the ABS actuator unit and lock the lock lever of connector securely.



LABS00088-00062

2. Check of fluid lines in actuator

CAUTION:

- Be sure to prevent the brake fluid from coming in contact with the painted surface and resin parts, using a piece of cloth or the like. If the brake fluid comes in contact with the painted surface and resin parts, immediately wipe off the brake fluid and wash with fresh water.

- (1) Loosen the brake pipes connected to the actuator from the master cylinder.
- (2) Ensure that the brake fluid will flow out without resistance when the brake pedal is depressed.

CAUTION:

- Be sure to depress the brake pedal gradually, otherwise a quite large amount of brake fluid will splash out.
- If no brake fluid flows out, check the fluid leakage or internal leakage in the brake master cylinder.

- (3) Tighten the flare nuts to the specified tightening torque.

Tightening Torque: $15.2 \pm 2.5 \text{ N}\cdot\text{m}$

- (4) Loosen the brake pipes connected to the actuator from the wheel cylinders.
- (5) Ensure that the brake fluid will flow out without resistance when the brake pedal is depressed.

CAUTION:

- Be sure to depress the brake pedal gradually, otherwise a quite large amount of brake fluid will splash out.
- If no brake fluid flows out, replace the actuator with a new one, after inspecting the P valve for fluid continuity.

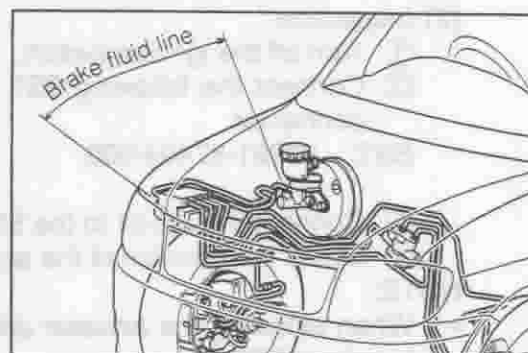
- (6) Tighten the flare nuts to the specified tightening torque.

Tightening Torque: $15.2 \pm 2.5 \text{ N}\cdot\text{m}$

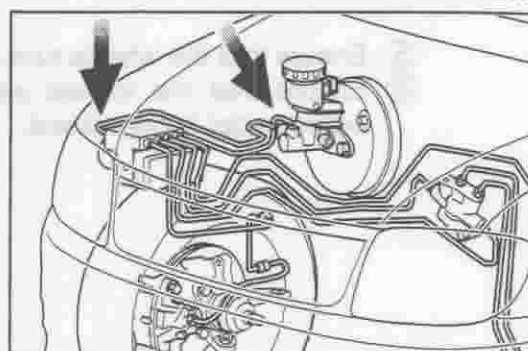
3. Function check of actuator using DS-21

(1) Preparation before inspection

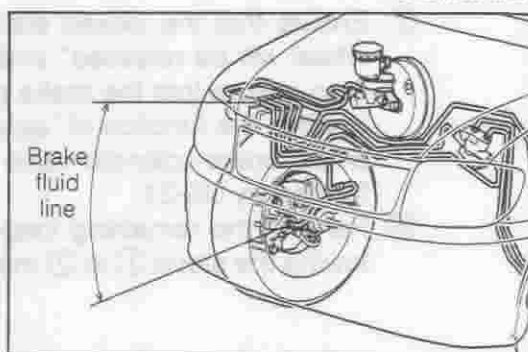
- ① Check the brake system, using a brake tester.
- ② Jack up the vehicle and support it with safety stands.
(Refer to the GI section for supporting position of the safety stand.)
- ③ Release the parking brake.
- ④ Place the shift lever to the neutral position.
- ⑤ Ensure that the wheels turn properly.



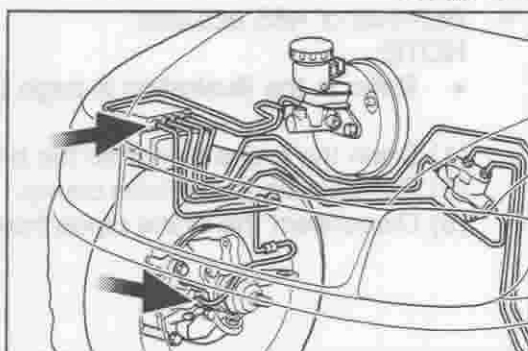
LABS00089-00063



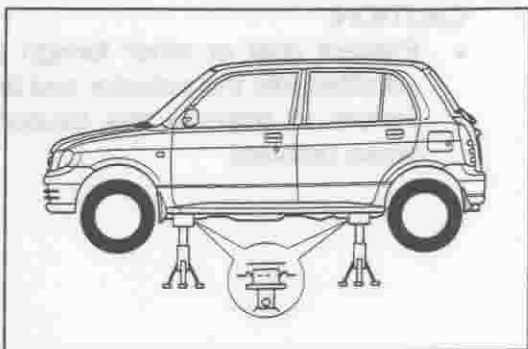
LABS00090-00064



LABS00091-00065



LABS00092-00066



LABS00093-00067

(2) Inspection

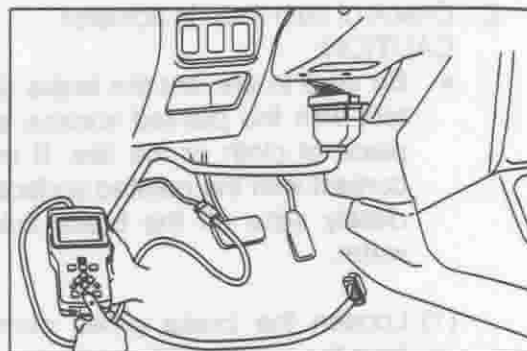
- ① Turn off the ignition switch.
- ② Connect the following SST to the diagnosis check connector.

SST: 09991-87404-000

- ③ Connect the DS-21 to the SST connector.
- ④ Select the function of the actuator drive in DS-21.

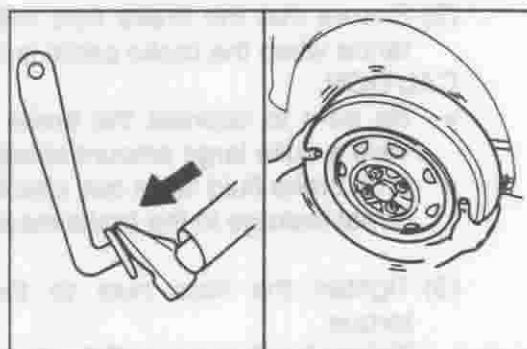
NOTE:

- When selecting the actuator drive, release the security function of DS-21.



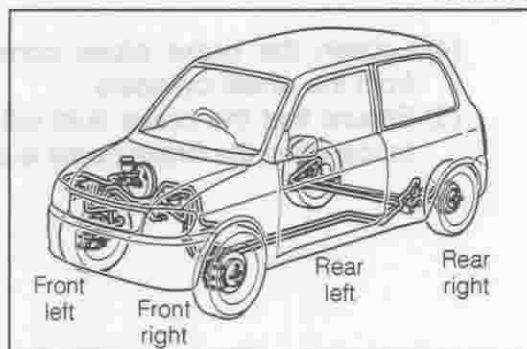
LABS00094-00068

- ⑤ Ensure that the wheels turn properly.
- ⑥ Ensure that the wheels will be locked when the brake pedal is depressed.



LABS00095-00069

- ⑦ Ensure that the locked state of the "front side left wheel will be released" and the wheel turns freely. Also ensure that the brake pedal will rise up slightly when the function of "actuating the front side left wheel brake solenoid valve in the actuator" is performed by DS-21.
- ⑧ Perform the remaining inspection one by one, following the steps ① to ⑦ mentioned above.



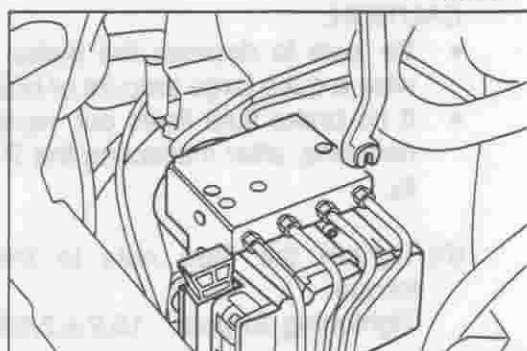
LABS00096-00070

4. Removal of ABS actuator

NOTE:

- Refer to the illustration in page BR-64.

- (1) Drain the brake fluid from the brake system.
- (2) Remove the brake tube clamp.
- (3) Disconnect the brake pipes from the actuator.



LABS00097-00071

CAUTION:

- Prevent dust or other foreign substances from being admitted into the actuator and brake line.
- Failure to observe this caution may lead to serious brake problem.

LABS00098-00000

(4) Remove the actuator by removing the attaching nuts.

CAUTION:

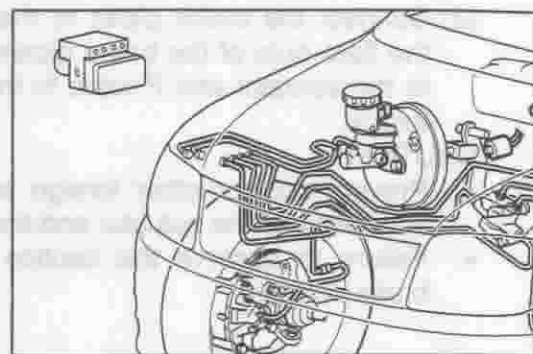
- Never deform the brake pipes during the removal of the actuator.

(5) Removal of ABS actuator bracket

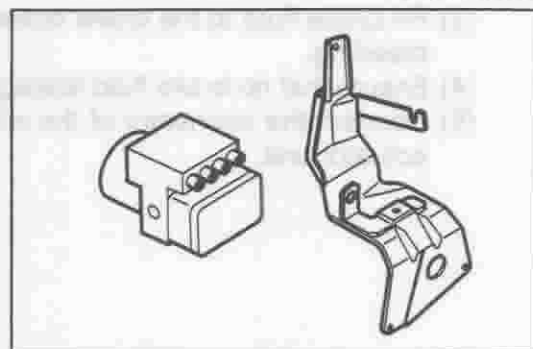
- ① Disconnect the brake pipe from the brake pipe clamp.
- ② Disconnect the brake pipe (connected from the front inlet P valve to the actuator) from the P valve.

CAUTION:

- Prevent dust or other foreign substances from being admitted into the brake line.
 - Failure to observe this caution may lead to serious brake problem.
- ③ Remove the ABS actuator bracket with the brake pipe by removing the attaching bolts.



LABS00099-00072

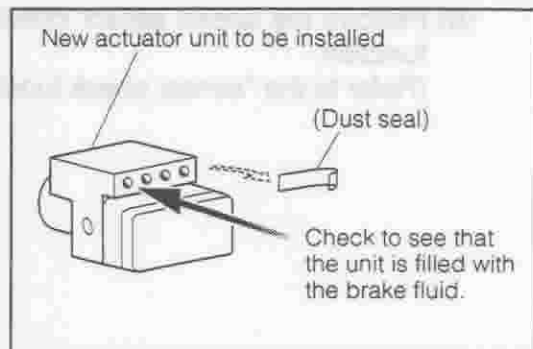


LABS00100-00073

5. Installation of ABS actuator

WARNING:

- Before replacing the ABS actuator, be sure to confirm that the actuator in the unit state is filled with the brake fluid.



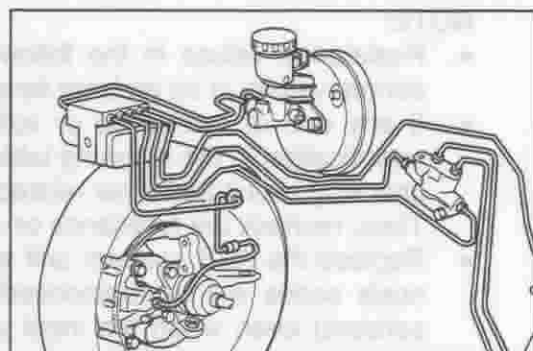
LABS00101-00074

(1) Installation of ABS actuator bracket

- ① Insert the brake pipe (connected from the P valve to the front inlet of the actuator) in the brake actuator bracket.
- ② Install the ABS actuator bracket by installing the attaching bolts and tighten the attaching bolts to the specified tightening torque evenly.
- ③ Connect the brake pipe to the P valve temporarily by your hand.
- ④ Install the actuator with the attaching nuts and tighten them to the specified tightening torque.

CAUTION:

- Never deform the brake pipes during the installation of the actuator.



LABS00102-00075

LABS00103-00000

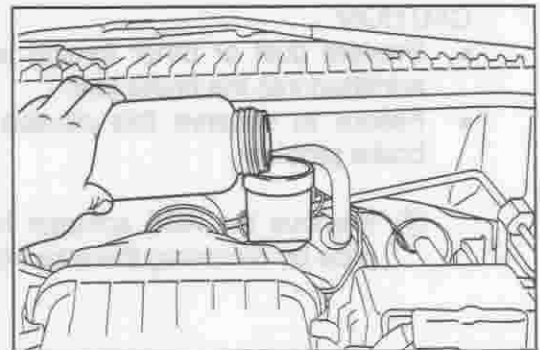
- (2) Connect the brake pipes to the actuator and tighten the flare nuts of the brake pipes which are connected to the actuator and P valve to the specified tightening torque.

CAUTION:

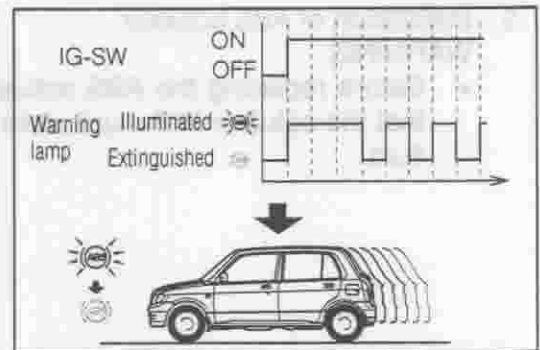
- Prevent dust or other foreign substances from being admitted into the actuator and brake line.
- Failure to observe this caution may lead to serious brake problem.

- (3) Fill brake fluid to the brake system and perform the air bleeding.
- (4) Ensure that no brake fluid leakage exists.
- (5) Connect the connector of the wire harness to the ABS actuator unit.

- (6) Perform the speed sensor check by the sensor check function.
(Refer to the "sensor check function" section.)



LABS00105-00076



LABS00106-00077

NOTE:

- Resistance values in the following table given below denote values at an ambient temperature of 20°C.
- If any one of resistance or voltage fails to meet the specification in the following table, repair or replace the checking circuit and other related parts properly. Then, recheck the resistance or voltage.
- Replace the ABS actuator unit with a new one. if diagnosis codes will be memorized (except wheel speed sensors) even when the input voltage and resistance meet following specified value.

LABS00107-00000

Input voltage and resistance of ABS actuator unit.

Terminals	Standard voltage or resistance	Condition	Remedies
① - ②	0 volt	Ignition switch turned ON and OFF.	• Front left speed sensor
	$1.4 \pm 0.4 \text{ k}\Omega$	Ignition switch turned OFF.	
④ - ⑧ or ②④	0 volt	Ignition switch turned OFF.	• Battery • ECU fuse 10 A • Ignition switch • Related circuit
	Approx. battery voltage	Ignition switch turned ON.	
⑤ - ⑥	0 volt	Ignition switch turned ON and OFF.	• Rear left speed sensor
	$1.4 \pm 0.4 \text{ k}\Omega$	Ignition switch turned OFF.	
⑦ - ⑧ or ②④	0 volt	Ignition switch turned OFF.	• Open wire or short circuit
		Ignition switch turned ON.	
⑧ - Body ground	0 volt	Ignition switch turned OFF.	• Ground circuit
		Ignition switch turned ON.	
⑨ - ⑧ or ②④	Approx. battery voltage	At all time	• Battery • ABS F/L 50 A • Related circuit
⑭ - ⑧ or ②④	0 volt	Ignition switch turned OFF.	• Open wire or short circuit
		Ignition switch turned ON.	
⑯ - ⑧ or ②④	0 volt	Ignition switch turned OFF.	
	Approx. battery voltage	Ignition switch turned ON.	
⑰ - ⑧ or ②④	0 volt	The brake pedal is not depressed.	
	Approx. battery voltage	The brake pedal is depressed.	
⑲ - ⑳	0 volt	Ignition switch turned ON and OFF.	• Front right speed sensor
	$1.4 \pm 0.4 \text{ k}\Omega$	Ignition switch turned OFF.	
㉒ - ㉓	0 volt	Ignition switch turned ON and OFF.	• Rear right speed sensor
	$1.4 \pm 0.4 \text{ k}\Omega$	Ignition switch turned OFF.	
㉔ - Body ground	0 volt	At all time	• Open wire or short circuit
㉕ - ⑧ or ②④	Approx. battery voltage	At all time	• Battery • ABS F/L 50 A • Related circuit

LABS00108-00000

SERVICE SPECIFICATIONS

Brake pedal	Pedal height	RHD	MT:	148.0 ± 5 mm	
			AT:	149.8 ± 5 mm	
		LHD	MT:	143.7 ± 5 mm	
			AT:	148.4 ± 5 mm	
	Free travel			0.5 - 3.0 mm	
	Reserve travel	RHD		74.0 mm or more	
LHD		78.0 mm or more			
Disc brake pad	Thickness	STD		10.0 mm	
		Minimum		1.0 mm	
Disc rotor	Thickness	STD		11.0 mm	
		Minimum		10.0 mm	
	Runout			0.1 mm	
Brake lining	Thickness	STD		3.9 mm	
		Minimum		1.0 mm	
Brake drum	Inner diameter	STD		165.0 / 180.0 mm (ABS)	
		Minimum		166.0 / 181.0 mm (ABS)	
Parking brake	Specified number of notches			4 - 7 notches	

LABS00109-00000

SSTs (Special service tools)

Shape	Part name	Part name	Remarks
	09730-87401-000	Brake booster gauge set	
	09737-87003-000	(Gauge)	
	09733-87401-000	(O-ring)	
	09731-87401-000	(Attachment)	
	09703-30010-000	Brake shoe return spring tool	
	09921-00010-000	Spring tension tool	
	09510-87301-000	Front hub & drum puller	
	09991-87403-000	Diagnosis check wire	
	09991-87404-000	Engine control system inspection wire	

LABS00110-00000

TIGHTENING TORQUE

Tightening components	N·m	kgf·m
Brake pedal clevis × brake push rod (lock nut)	22.6 - 28.4	2.6 ± 2.9
Stop lamp switch lock nut	19.4 - 31.6	2.0 - 3.2
Bleeder plug	6.9 - 9.8	0.7 - 1.0
Brake pedal × brake pedal bracket	15.2 - 22.4	1.5 - 2.3
Brake master cylinder × brake booster	11.8 - 17.6	1.2 - 1.8
Brake pipe × brake master cylinder	12.7 - 17.7	1.3 - 1.8
Brake booster × dash panel	9.8 - 15.7	1.0 - 1.6
Caliper mount bolt	37.3 - 49.0	3.8 - 5.0
Brake hose × disc brake cylinder assembly	26.5 - 34.3	2.7 - 3.5
Brake backing plate × rear axle carrier	34.0 - 42.0	3.5 - 4.3
Wheel speed sensor × brake backing plate	6.4 - 9.3	0.65 - 0.95
Wheel cylinder × brake backing plate	7.8 - 11.7	0.8 - 1.2
Brake pipe × wheel cylinder	12.7 - 17.7	1.3 - 1.8
Parking brake cable × brake backing plate	6.3 - 9.2	0.64 - 0.96
Rear axle hub castle nut	58.8 - 78.5	6.0 - 8.0
Parking brake cable attaching bolts	5.9 - 8.8	0.6 - 0.9
Parking brake handle assembly × floor panel	14.7 - 21.5	1.5 - 2.2
Proportioning valve × body	5.9 - 8.8	0.6 - 0.9
Proportioning valve × brake tube	12.7 - 17.7	1.3 - 1.8
Push rod adjusting nut	17.6 - 24.5	1.8 - 2.5
Speed sensor harness clamp × inner fender	6.9 - 9.8	0.7 - 1.0
Speed sensor harness clamp × floor panel	6.9 - 9.8	0.7 - 1.0
Front speed sensor clamp × fender	6.9 - 9.8	0.7 - 1.0
Front speed sensor × knuckle	15.2 - 23.0	1.55 - 2.35
Rear speed sensor clamp × floor panel	6.9 - 9.8	0.7 - 1.0
Rear speed sensor × rear brake	6.9 - 9.8	0.7 - 1.0
ABS actuator × ABS actuator bracket	10.0 - 2.0	1.02 ± 0.2
Brake pipe × ABS actuator	15.2 ± 2.5	1.55 ± 0.25
ABS actuator bracket × fender apron	6.8 - 9.8	0.7 - 1.0
Flare nut	15.2 ± 2.5	1.55 ± 0.25
Stop lamp switch	19.6 ± 7.8	2.0 ± 0.8
Brake pedal × brake pedal bracket	14.7 - 21.6	1.5 - 2.2
Front disc brake assembly × steering knuckle	31.4 - 41.2	3.2 - 4.2

LABS00111-00000